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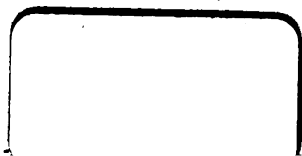
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Original Articles.

I.—AN INQUIRY INTO THE CAUSE OF PULSE DICROTISM.

By DAVID C. M'VAIL, *Licentiate of the Royal College of Physicians of Edinburgh, Glasgow.*

(*Read before the Glasgow Medico-Chirurgical Society, in October, 1872.*)

Introductory.

SINCE the introduction of Marey's sphygmograph there has been much speculation, on the part of those who have used the instrument, as to the causes which produce the secondary wave that in some states of the circulation succeeds the great primary pulse-wave. The double or dicrotic pulse was not indeed absolutely discovered by the sphygmograph. Physicians of the last century were very familiar with this pulse, but as they had no clear idea either of its cause or significance, on the introduction of auscultation and other more exact means of physical diagnosis early in the present century, it began to retire from the general professional view. This occurred because the attention was much monopolised in mastering the newly-acquired and then unprecedentedly certain diagnostic methods, and also because the possession of such methods rendered pulse minutiae of far less consequence in many cases than formerly.

In this way may be explained the fact that physicians of the present and immediately preceding generations have

generally, in their writings, either ignored entirely, or referred but incidentally to, the dicrotic pulse. Thus, Dr Walshe, in his well-known treatise on Diseases of the Heart, in one place merely states that the pulse may be re-duplicate or bis-feriens; and in another place he says that the diseased vessel becomes, under certain circumstances, the seat of a double impulse with each contraction of the left ventricle, the arterial systole conveying to the hand an appreciable shock. Beyond this, Dr Walshe has nothing to say on dicrotism as connected with the pulse. Dr Hope, in the fourth edition of his great work, neither in his comprehensive table of pulses, nor in the body of the book, makes any allusion to a dicrotic, double, or re-bounding pulse. He states that Laennec despised the pulse as a diagnostic means. Dr Latham, in his beautiful lectures, makes no allusion to it. Dr Graves, in his Clinical Medicine (1st edition) is dumb on the subject. Dr Todd, in his classical volume on acute diseases, never refers to dicrotism. In Trousseau's second volume—that on acute diseases principally—he alludes but once, and only alludes, to a pulse bis feriens, in his account of Typhoid Fever. Dr Murchison, in his great work on Fever (1st edition), says in one place that now and then the pulse is observed to be irregular, intermitting or dicrotous, and that these characters always point to a very weak condition of the heart. In another part of the volume the occurrence of a re-bounding pulse is mentioned. Beyond these slight references, he is silent regarding the double pulse. In Dr George Buchanan's article on Typhus Fever, in the first volume of Reynold's System of Medicine, the only mention of the matter made is that occasionally a dicrotous pulse is found. Nor does any other of the distinguished writers, whose essays compose that volume, make any mention whatever of dicrotism. In Dr Williams' Principles of Medicine, I have been unable to find any reference to the matter. In Aitken's fourth edition, published in 1866, it is in no way noticed. Kirkes, in the fourth edition of his Hand-book, is silent regarding it. Dr Thomas Young, in his celebrated Croonian oration on the Heart and Arteries,

says nothing about it. And Dr Guy, in his article on the Pulse in Todd's Cyclopædia, where, if anywhere, it should have found a place, does not allude, even in the most distant manner, to the double pulse.

These references are sufficient to show that, however perfectly physicians of a former day may have been acquainted with dicrotism, those of our time had, for the most part, ceased to take note of it, and thus to the introduction of Marey's sphygmograph is virtually due the re-discovery of the dicrotic pulse.

Theories of Dicrotism.

Unlike his great predecessor and countryman, the discoverer of auscultation, Marey has not been very successful in so explaining and accounting for the various phenomena brought to light by his instrument, as to leave like Laennec, only matters of detail to be supplied by others. More particularly is this true of dicrotism; indeed so little have his efforts in search of the causes of this ~~phenomenon~~ been esteemed, that Dr Burdon Sanderson of London, who has given much attention to the subject, does not even once allude to the theory proposed by Marey, nor does Dr Anstie, in his lectures before the Royal College of Physicians of London, in any way refer to it.

In all, three theories of dicrotism have been proposed. The earliest I have not succeeded in tracing to its source. It is, that the secondary wave is produced by a rebound from the aortic valve. This theory was, I imagine, accepted by those of the older physicians, who deemed muscular contraction of the arteries an insufficient explanation of the circumstance. The other two theories were proposed, the one by Marey and the other by Burdon-Sanderson; and of these, Burdon-Sanderson's, in this country, seems to be that most generally accepted.

The first theory, I understand, has been accepted, and is taught as the true theory by one of the teachers of Physiology of the Glasgow Medical School. It attempts to explain the matter thus: The contraction of the ventricle

propels its contents into the arterial system, stretching the elastic vessel walls. Immediately on the cessation of the systole, there is created by the falling in of the aortic valves, on the upper side of those valves, a state of minus tension. Eagerly availing itself of any means of relief, the enormously distended aorta forces back the column of blood within it so smartly against the valves, that it rebounds from them as a billiard ball from the India-rubber cushion. This theory, at first sight, seems not at all unlikely to be the true one; and when it is further considered that this very recoil against the valves is beyond dispute the cause of the second heart sound—a very considerable sound—it does not seem unreasonable to suppose that a shock sufficient to produce so great a sound may also be competent to create the wave motion in question.

Here at once a question suggests itself, an affirmative answer to which will do much to strengthen this theory, while a negative answer will almost quite overthrow it. Does the dirotic wave increase and diminish in magnitude coincidently with the intensity of the second heart sound? On this point the stethoscope and sphygmograph utter an emphatic NO. Where the heart sound is loud and strong as in vigorous health, the dirotism is either entirely absent or is present only in trifling degree; but where, as Dr Stokes long ago pointed out in the extreme debility of typhus fever, the heart sounds become very feeble, the sphygmograph shows that in these very circumstances the dirotism is greatest. This, however, cannot be regarded as absolutely conclusive against the theory, for it might be argued that possibly certain conditions favourable to the *display* of dirotism may have been developed in fever in a ratio greater than the decline in the force of the rebound from the valve.

But a more extended consideration of the subject will still further shake any remaining belief in this theory. A theory which seeks to explain a particular phenomenon must, to hold its ground, be able to account for any not uncommon variations which the phenomenon in question may

undergo. Now, the pulse is sometimes not only dicrotous but tricrotous or tetra-crotous, or consists of even more than four vibrations. Dr Anstie indeed gives a tricrotous pulse as the healthy pulse, under circumstances of the highest possible vigour. Moreover, sometimes not the *first* secondary wave, but the *second* secondary wave is the principal one; and here the theory manifestly breaks down, for while its supporters might contend that the aortic valve once struck powerfully might continue to vibrate for a time, they would not, by any hypothesis hitherto laid down, be able to account for the first secondary wave being less than the second.

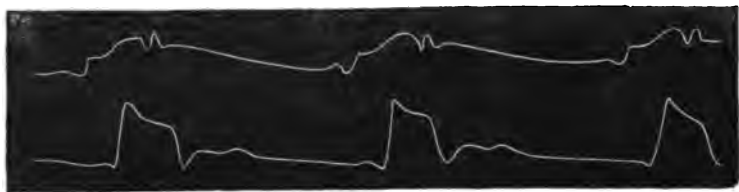
But direct experiment settles the question by showing that the aortic valves have nothing to do with dicrotism. Dr Burdon Sanderson obtained dicrotic tracings from an apparatus of his contrivance, when the valves, representing the aortic valves, were still open; and I obtained these dicrotic tracings (1 and 2 of Fig. VII.) by an apparatus that had no representative whatever of the aortic valve, that was indeed without a valve of any kind. It had a simple syringe action, the piston being depressed by a powerful lever through a certain distance for each complete pulsation in the tracings. The pump was of brass, and perfectly rigid; and to its outlet was attached the india-rubber tubing representing the arteries; it held water sufficient for about forty pulsations. Here then, there being no elastic valves nor valves of any kind, and the pump being inelastic, the secondary pulsations so evident in these tracings could not have been caused either directly or indirectly by the pump or the parts about it.

This experiment in conjunction with the antecedent reasoning leads inexorably to the conclusion that rebound from the aortic valves is not the cause of, and has nothing to do with, the production of the dicrotic pulse.

The theory proposed by Marey is certainly different in all respects from that, the merits of which have just been under consideration. He imagines the secondary wave to be a wave of reflection, an echo, as it were, of the great primary

pulse wave thrown back by elastic recoil from the vascular periphery. He describes the charge of blood shot out by the ventricle as, in consequence of its acquired force, leaving the aorta, and going to distend the extremities of the arterial system. Arrested here by the narrowness of the artery, it is reflected again to the origin of the aorta, but the road is stopped by the sigmoid valves, new obstacle, new repulse, and, in consequence, new rebound. These alternate oscillations go on until a contraction of the ventricle takes place, putting an end to them by producing a new pulsation. In support of his view, he compares the form of pulse recorded at the same time in different arteries. He refers to this diagram (Fig. I.), in which the upper line is an aortic tracing taken synchronously with the lower line, which is a femoral tracing.

FIG. I.



Simultaneous tracings by Marey. The upper is Aortic, the lower Femoral.

He also gives this figure of an aortic and facial tracing, taken simultaneously (Fig. II.).

FIG. II.



Simultaneous tracings by Marey. The upper is Aortic, the lower Facial.

He calls attention to the dicrotism being more pronounced in the femoral than in the aorta, and in the facial than in the

aorta, and from this he infers that the oscillation being greater near the periphery than near the centre, it must have been produced at the periphery.

In his more analytical account, he describes the column set in motion by the heart as taking an acquired speed in virtue of which it distends the distal extremities, and after the speed has been exhausted, the recoil of these branchlets sends a wave backwards to the centre. He thus believes the dicrotic wave to be a centripetal wave, and one of his principal proofs is the greater size of the secondary wave in the distal femoral, and facial, than in the more central aorta, before reaching which it loses magnitude by friction.

Now, Marey, in his eagerness to prove his theory, has overlooked the important point in these tracings, that not only is the secondary wave of the aorta dwarfed as compared with the secondary waves of the femoral and facial, but the primary wave also, is dwarfed; the total aortic pulsation is, considering the relative sizes of the vessels in question, small in the extreme. And so is this argument of Marey's deprived of its significance; for, relatively to the whole tracings, the femoral and facial dicrotism are little, if at all, greater than the aortic.

But finally conclusive against Marey's theory is another feature of these tracings, which, in this connection, must also have escaped his notice. It is, that in the aorta the dicrotism occurs *prior* to its occurrence in the more distant femoral, and facial. How he could have overlooked this, I know not, but it at once and completely annihilates his theory, for be this secondary pulsation what it may, it cannot be a rebound or echo from the periphery, seeing that it takes place towards the centre *sooner* than towards the more remote parts of the arterial system.

Dr Burdon Sanderson's explanation of the cause of dicrotism is as follows:—He says, "let us take the simplest case, that of the radial or other artery, not far from the periphery. As regards the arteries of ultimate distribution, there are two facts to be borne in mind—first, that these arteries as they

become smaller become more distensible; and secondly, that in the capillaries themselves the resistance to the passage of blood is much greater than any which has been encountered in the arteries. Just as the expansion of the aorta determines that of the radial, the radial expansion determines and is followed by that of the peripheral arterioles. Hence, at a certain moment, the radial is subsiding while the arterioles are still swelling; so that when at their acme of distension, the pressure is greater at the periphery than in the radial itself. The other fact is that the resistance to the flow of blood is very much greater at the capillaries than at any part of the arterial circulation. Immediately behind this resistance pressure increases, and goes on increasing so long as blood enters the arterioles from behind more rapidly than it is discharged in front. The effect of this state of things it is not difficult to understand. The circulation is closed behind by the aortic valve, and virtually closed in front by the capillary resistance. In the largest arteries the expansion is ebbing, in the smallest it is culminating, so that for an instant the pressure is greater in the latter than in the former. There is but one effect possible. The restoration of equilibrium must take place by increase of pressure towards the heart, and diminution towards the periphery. This restoration of equilibrium constitutes the second beat."

This theory of Burdon Sanderson's is simply Marey's theory in a new dress. Marey's return wave is an attempt towards the restoration of equilibrium, and Burdon Sanderson's words are "the restoration of equilibrium must take place by increase of pressure towards the heart, and diminution towards the periphery." He avoids the term, "return wave," and instead uses the longer expression, "increase of pressure towards the heart," and even this he does not seem to care about tracing backwards all the way. In his table of synchronous conditions, he omits to explain how the state of expansion of the peripheral arteries mentioned at the end of the second line finds its way back to the carotid, as mentioned at the beginning of the third line. It *must* have

travelled carotid-wards over the intervening space, but of this he takes no notice.* There is a link in the chain of his reasoning wanting here, a link which, when supplied, destroys his theory, as experiment has not shown any return pulsation from the periphery towards the heart.

Author's Theory.

How, then, may dicrotism be accounted for. It is clear that any true theory of the double pulse will also explain the occurrence of tricrotism, and any degree of polycrotism; and it will not be inconsistent with what the simultaneous double tracings of Marey show to be the case, namely, that the secondary, like the primary wave, occurs first near the heart, and from this appears at all parts in succession, outwards to the periphery. Another condition which a true theory will fulfil is, that it will explain how in health, when the arterial tension is high, as evidenced by a firm pulse there is little or no dicrotism; but how, as in typhus, when the tension is low, as shown by a soft, compressible pulse, dicrotism becomes for a time more and more developed. It will also explain how it is that in the extreme exaggeration of lowness of tension, as in a typhus patient near to death, the dicrotous pulse may entirely disappear, the tracing becoming once again monocrotic.

The explanation of dicrotism that I am now to submit to your criticism is in perfect harmony with all these conditions, and is not, so far as I can judge, at variance with any hæmostatic or hæmodynamic law.

In the theories which have been spoken of, the secondary wave is supposed to originate at one or other end of the arterial system, and to be thence propagated along the

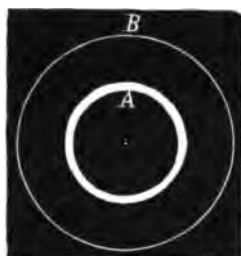
* BURDON SANDERSON'S TABLE OF SYNCHRONOUS CONDITIONS.

<i>Carotid.</i>	<i>Radial.</i>	<i>Peripheral Arterioles.</i>
Fully expanded.	Expanding.	Collapsed.
Contracting.	Expanded.	Expanding.
Again expanding.	Contracting.	Expanding.
Stationary.	Again expanding.	Slowly contracting.
Contracting.	Contracting.	Contracting.

arteries in one or other direction, each point of the vessel being in this secondary distension as perfectly passive as in the primary expansion caused by the heart itself. Now, the opinion to which I have come is that the dicrotism occurring in any particular part or segment of an artery is produced *in that very segment itself*, or indeed in a sense *by* that very segment, as an after-effect of the passage through it of the primary pulse wave. It acts not in the direction of the axis of the vessel, but transversely to the axis.

For example, take any arterial section whatever, and (Fig. III.) let its state just before the cardiac systole be re-

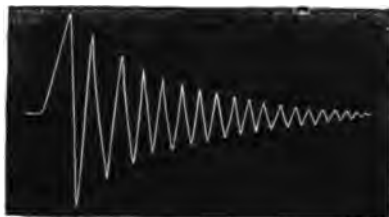
FIG. III.



presented by the heavy line A, of the diagram; and let the thin outer line B, represent its state as produced instantaneously by the systole. The vessel, from being in the state A, has, by an independent agency and by no effort of its own, but in spite of its own efforts to the contrary, been sent into the position B. But having been brought into this position, the agency passes on to the next segment, and leaves this one to return to its old position as best it can. Now, suppose that in its return journey it had no resistance to encounter, it would not only return speedily to its original position A, but would pass considerably beyond it, from which it would again return to A, and pass through it towards B; and this vibration to and fro would be continued, the amplitude each time becoming smaller from friction, until finally it would again come to rest at A. If, during this operation, the point had been made to write its

history on a plate moved at a uniform rate by clockwork, the tracing would be something like that of Fig. IV.

FIG. IV.



Having come to rest once more at A, let it again be forced up to B, but now let there be between B and A a resistance to be overcome, so great that in order to return as rapidly as it did in Fig. IV., it would need to be say one hundred times stronger than it is, but still let the resistance be not absolutely beyond the power of the vessel to move it along in some fashion. Suppose the resistance also to be uniform all through. The return journey would now be a slow, unbroken descent from B to A, something like Fig. V. And yet it would not be like fig. V., for here the

FIG. V.



descent is a straight line, it would in reality be a parabolic curve as in Fig. VI.

FIG. VI.



It would be parabolic from the same cause which requires that a perfect watch fusee be parabolic. If from the ceilir

we had a narrow ribbon of india-rubber suspended, and if to its free end we attached a pound weight, the ribbon would be stretched towards the floor a certain distance, say a foot. The addition of another pound would stretch it through a second foot, a third pound through a third foot, and so on. That is, if it required one pound for the first foot, it would need two for the second, three for the third and so on. Consequently, in its return journey it would spring back through the third foot with three times the speed or power that it would have if returning only through the first foot; and through the second it would come back twice as quickly as through the first. This is the reason of the parabolic nature of the curve. Every succeeding increment of distension of the vessel requires for its accomplishment greater force than did the one preceding, and if a resistance of constant power had to be overcome in the return journey, the journey would be accomplished with an ever decreasing speed, and if its course were written on a plate moving uniformly it would appear as a parabolic curve.

We have taken two extreme cases. In the first we had A raised to B. and then left to take its own course free from all resistance. In the next case it was opposed by an enormous weight, which it was just able to move and no more. The first case shows us that every elastic tube has, where its equilibrium is disturbed, an inherent tendency to polycrotism, and the second case shows how the vibratory tendency may be completely held in check. And it follows that in proportion as the opposing force is weak or strong in comparison with the elastic power of the artery, the tendency to polycrotism will be great or small.

Moreover, from what has been said in explanation of the parabolic curve of Fig. VI., it follows that the opposing forces may be so matched that one or two vibrations might occur at a high position of the tracing, ere in its return journey the vessel wall sinks to a point where its own strength in relation to the opposing force becomes so little that it is unable to vibrate, and can only just send slowly on its controlling antagonist. And the more suddenly the original heart pulse

acts on any particular segment, the greater will be the tendency—other things equal—to the manifestation of a dicrotic wave in close approximation to the primary wave.

But, if the force opposing the return journey be not a constant, but a diminishing force, the inherent tendency of the vessel to dicrotism, although over-matched at the outset of the return journey, may gain the day further on, and vibrate once or twice before its march is finished.

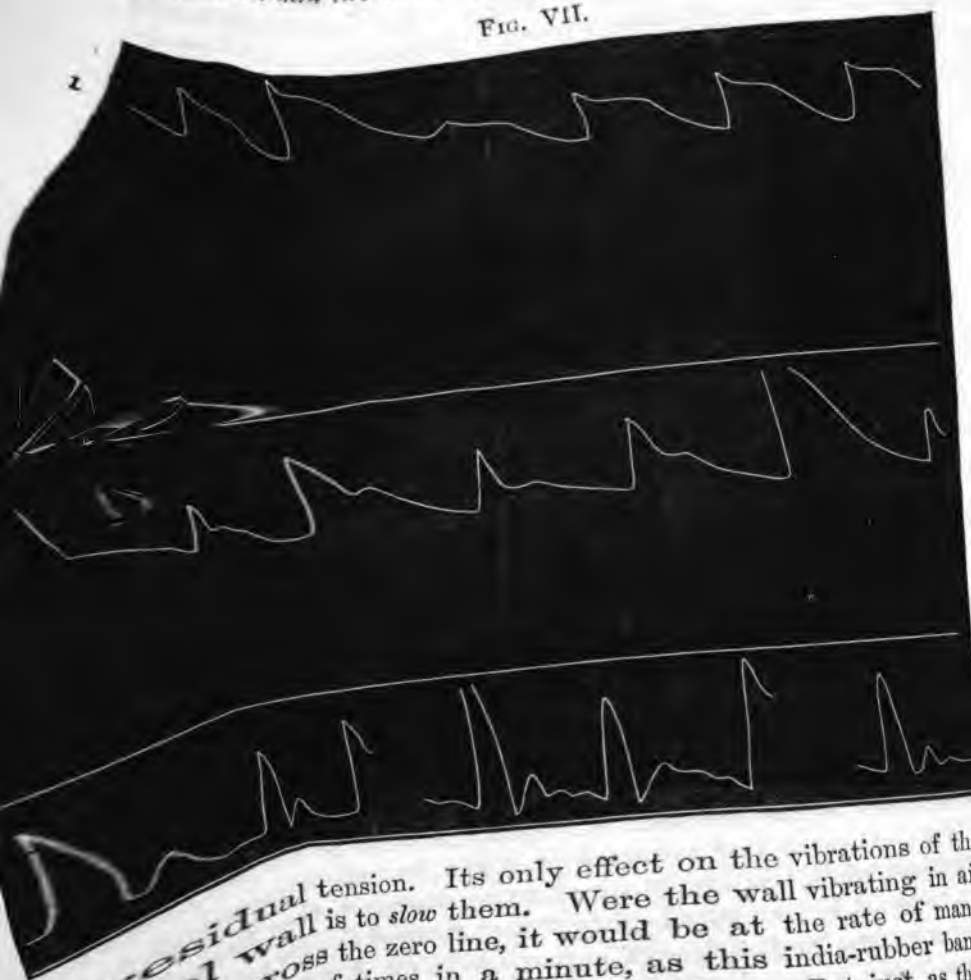
Thus may be accounted for the production of secondary waves, one or more at any part of the descending pulse line, and by this mode of explanation also can the form of any particular secondary wave be understood; for as the strength of the vibratory tendency is small or great at that particular instant of time, in comparison with the opposing force, so will the vibration be small or great, ranging from a mere break in the line of descent to a vibration extending below that level from which the particular part of the vessel wall was originally raised by the cardiac systole.

It becomes now desirable that we inquire more particularly into the nature of this force, which opposes and modifies the return journey of the vessel wall. What is it? how is it produced? and in what ways may it vary?

The opposing force is due to the difficulty which the blood meets with in its passage through the capillaries. It is a full expression of that difficulty conveyed to every part of the arterial system, just as the weight applied to the smaller piston of the hydraulic press, presses in full on every point of the internal surface of both cylinders. Its degree is indicated by the amount of residual arterial tension, that residue or overplus of tension, pumped into the arteries by the heart, which has not time to escape between the beats of the heart—is constantly trying to get through the capillaries, but as constantly the heart is too quick for it, and so prevents it from ever wholly passing away. With every change in the condition of the body, the amount of the residual tension varies. These tracings, Fig. VII., will illustrate the effects produced on the pulse by augmentation of the residual tension. The straight line under tracing 3, represents the

position of the vessel wall, when the tube is simply filled, but not distended in any way, with water. The space between this and the lower parts of the tracing is the amount

FIG. VII.



of residual tension. Its only effect on the vibrations of the vessel wall is to *slow* them. Were the wall vibrating in *only*, across the zero line, it would be at the rate of many *hundreds* of times in a minute, as this india-rubber band stretched between these two points does. But just as the metal rider brings down the rate of vibration to once or twice in a second, so does the opposing force indicated by the residual tension damp down the vibratory rate of the tube that shown in the tracing.

In tracing 2 the residual tension is fully four times as great as in tracing 1, as is shown by the distance between the tracing and the zero line. Here the vibratory tendency of the vessel is checked when about half the return journey is accomplished, and only one small dicrotic wave is allowed, the remainder of the descent being a slow unbroken line.

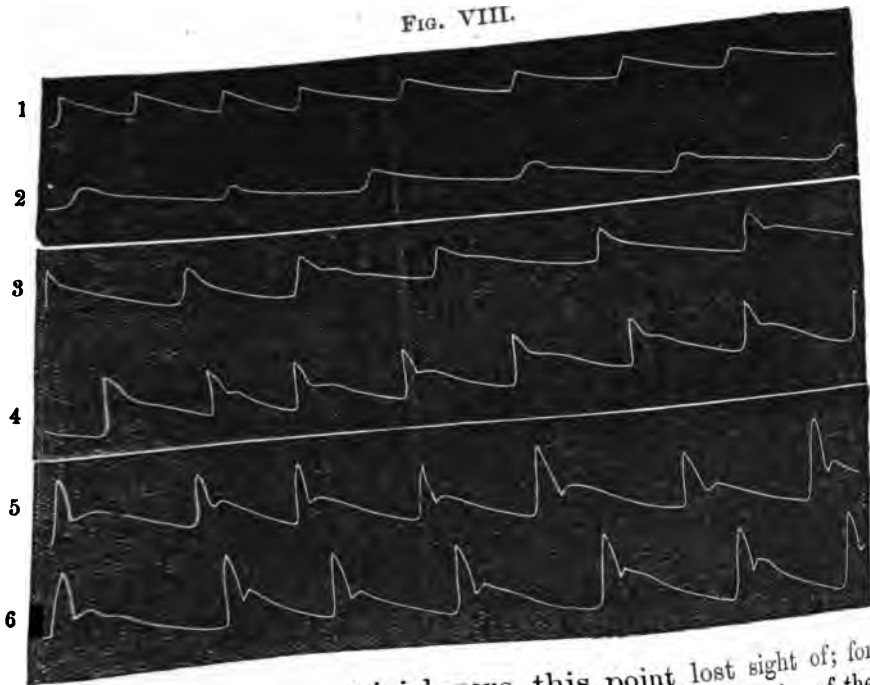
In the upper tracing the tension is enormous. Here the vibratory attempt is checked almost at once, there is no true dicrotism, only a slowing for a time of the line of descent. But again vibration is tried for in this intermediate quicker descent, and again it is baulked, only another slowing of the descent being the result of the effort.

In No. 2 the dicrotism occurs much higher in the tracing than in No. 1, and in No. 3 the *attempt* at dicrotism is far higher than in No. 2. This would seem to teach that the greater the tension, the higher in the tracing and the nearer to the apex of the primary wave will the secondary wave occur. A more complete series of tracings confirms this. In Fig. VIII. tracing 6 is about equivalent to No. 2 of Fig. VII., and from this upwards the tension for each rises until in 1 the very utmost limit is attained. And as the tension rises so does the dicrotic wave rise in position towards the apex of the primary wave, until in 2 it is just as it were about to run off at the point altogether, and in No. 1 it is altogether gone. From this it would appear that the nearer to the apex of the primary wave the secondary wave is found, the greater, other things being equal, is the tension; and vice versa. This may prove a useful guide in estimating the amount of arterial tension.

The tracings on this sheet, Fig. VIII., suggest a most important question. Why, as the tension increases, should the area included by the whole pulse line diminish? Does the heart send less blood into the vessel when it gives tracing 1, than when it gives tracing 6? This question of course implies that the area of a tracing is representative of the amount of blood sent into the arterial system with each stroke of the heart; and as the blood is incompressible, and as the heart acts on any part of a vessel only through the

blood, the implied idea must be correct. Is there then less blood sent under tracing 1 than under tracing 6? There is not necessarily any less, for in 1 the diameter of the vessel is greater than in 6. The blood wave ensheaths a thicker core, it enters a wider channel, and so the elevation is less. Moreover, this same cause will lessen the apparent magnitude of dirotic waves, and thus important dirotism might

FIG. VIII.



be passed over as trivial were this point lost sight of; for the same amount of dirotism relatively to the size of the primary wave, might in one case seem to be much less than in another, when really the same for both.

Dr Thomas Young, in his great Croonian lecture, demonstrated that the pulsation as felt by the hand is in proportion to the size of the vessel, and that to this cause is due the great impulse of an aneurism. In a large aneurism the throb is so very powerful that surely here at all events dirotism must have been frequently so very evident that,

even before the sphygmograph, it would force itself on the attention of physicians. And so it did. Thus, Dr Walshe says:—

“The hand, applied to the bulged surface, appreciates more accurately the motion of the sac,—generally a very little behind the apex-beat of the heart in point of time, its systolic impulse is sometimes, so far as the sense of touch can determine, synchronous with this. By systolic impulse we mean that synchronous with the systole of the heart: if the vessel alone were considered, this impulse would of course be called diastolic. In certain instances, by no means in all, the impulse is double, a receding as well as an expanding motion existing,—nay, in some cases of the sort, the diastolic action amounts to distinct impulse against the chest-wall, instead of, as usual, a mere receding jog. The force of the systolic impulse is sometimes extreme; even from a sac of small size, and mainly seated behind the sternum, which may have undergone but very slight erosion, the throb may be sufficiently strong to shake the head applied to the stethoscope. I have known the diastolic impulse even similarly forcible.”

I cannot find, however, that such observations have been much noticed, or have been of any great use in the diagnosis of aneurism. But with a clear understanding of the cause and significance of the dicrotic vibration, the existence of aneurism will be rendered certain in many cases otherwise very doubtful. For just as a pendulum vibrates slowly in proportion to the square root of its length, so will the oscillations of the tube wall be slower in proportion to the square root of the diameter of the tube. Thus, if an artery becomes enlarged at any point, the interval between the primary and secondary waves will be longer than in the undilated part of the artery, or than in any artery of the same diameter and in the same relative position to the heart. For example, the length of the interval, or as it may be called the *dicrotic period*, will be greater in a tracing given by a pulsating point behind one clavicle than behind the other, if from any cause the artery of the former be greater in diameter than that of the latter.

Moreover, the length of the dicrotic period would enable us to estimate with considerable precision the thickness of an aneurismal sac wall, provided the thickness were uniform all round, and that we knew the external diameter of the sac.

And be the sac wall ever so irregular as regards thickness, the gradual shortening of the dicrotic period will keep

us informed of the rate at which the sac cavity is becoming obliterated either spontaneously or under treatment.

These practical applications are legitimate deductions from this explanation or theory of dicrotism.

Experiment has repeatedly shown me that, *cæteris paribus*, the more *smartly*—*smartly* I mean as distinguished from *powerfully*—the heart stroke is delivered at any segment of a vessel, the greater is the tendency to dicrotism. Lowness of tension favours smartness of the delivery; and thus in fever, and where the arterial system is in a condition analogous to its state in fever, these two conditions favourable to dicrotism—smartness of stroke and lowness of tension—go hand in hand, together they reach a climax, and together they decline.

Where the arterial tension is so inconsiderable that between the beats of the heart the weight of the sphygmograph spring presses the sides of the vessel together, there will be little or no dicrotism. This condition is shown in Fig. IX., where the lowest portions of the tracing coincide with the zero line. The obstruction being lifted by the pulse wave passing under, falls back much as a dead weight would do, the tendency to rebound being scarcely appreciable.

FIG. IX.



I have thus laid before you what I conceive to be the true explanation of dicrotism. It now awaits your criticism. You will say in how far you think it succeeds in explaining those of the known facts of the double pulse that have been referred to in the course of the paper, and also any other dicrotic phenomena that have not been particularly brought under notice to-night. Every new theory that is a true theory opens the way to further observation, and the one just described—if ultimately established, will enable us to esti-

mate with far greater precision than hitherto, the variations, normal and abnormal, of arterial tension.

The sphygmograph has not yet attained to its true position among the aids to diagnosis; it is still more a toy than anything else. But by and bye it will, in the estimation of the physician, rank second to no exploratory instrument—not even to the stethoscope itself. The present paper is a contribution in furtherance of this end, this elevation of the pulse-writer to its proper place in medical diagnosis.

II.—ON SOME OF THE NERVOUS AFFECTIONS OF THE LARYNX.

By EBEN. WATSON, A.M., M.D., *Professor of Physiology in Anderson's University, and Surgeon to the Royal Infirmary, Glasgow.*

NOTWITHSTANDING the great attention which has lately been paid to diseases of the throat and wind-pipe, comparatively little has been written upon the nervous affections to which these organs are liable. This may be due to various causes. The difficulty of making a clear and exact diagnosis in many of these cases, and the unsatisfactory results of the treatment in others, are, I believe, among the chief causes of this apparent neglect. Yet such cases are not unfrequent in occurrence; they are always troublesome and sometimes imminently dangerous in their nature, and the line of practice in not a few is by no means so definite as might be desired. On the other hand, we have in these days a means of diagnosis in the laryngoscope fitted to explain to us much that in former times was mysterious in this class of cases, especially when their phenomena are read in the light of modern physiology; and I believe that the treatment may now be made as definite in this as in any other department of our difficult and, to some extent, uncertain art.

The nerve supply of the larynx is very peculiar and complicated. The pneumogastric is its principal source, but that nerve has communicating branches with the spinal accessory, the glossopharyngeal, and the sympathetic. It seems to me that the last named branches are the most

important physiologically. These connect the first and second ganglia of the pneumogastric with the highest cervical ganglion of the sympathetic, and distribute the influence of the latter with the branches of the former nerve. To this fact I am inclined to attribute the ordinary excitability of the glottis, as well as its involuntary movements in respiration; while to the branches of the cerebro-spinal nerve I would assign those voluntary movements of the glottidean muscles upon which all kinds and degrees of vocalization depend. To these same compound nerves is likewise due the common sensibility of the laryngeal lining membrane; and I do not think it very important to distinguish between the functions of the superior and inferior laryngeal nerves, for they unite most thoroughly both at the back of the cricoid and at the side of the ala of the thyroid cartilage. Nevertheless, I do not doubt that the inferior laryngeal is the more important motor nerve of the glottis, both from its supplying all the intrinsic muscles of the larynx, and also from the result of section of the nerve in the living animal. Not many days ago, in experimenting for another purpose on the nerves of the neck of a horse, I accidentally cut one of the recurrent nerves, and immediately that remarkable change took place in the breathing which renders the animal "a roarer," as it is called; for thus paralysis of one half of the glottis had been produced. I believe that had section of the recurrent laryngeal on the other side been performed, the animal would speedily have died from paralytic closure of the glottis, unless, indeed, tracheotomy had at once been adopted.

I shall not at present enter further upon the physiology of the laryngeal nerves, but content myself with remarking on its very close and obvious connection with practice, as will be observed in the sequel. I rather proceed at once to the morbid affections of these nerves, which for practical purposes may be divided into the three following classes:—viz., 1. Affections of the laryngeal nerves from hysteria; 2. Those from obvious and external causes; 3. Those from internal or intrinsic causes.

1. The affections of the laryngeal nerves from hysteria are very various. They are "mimicries," as Sir James Paget would call them, of different diseases, thus we have choking sensations, cough of peculiar, generally of croupy character, and all different degrees of aphonia from mere weakness of voice to its absolute extinction.

I have been consulted in a good many cases of loud, barking, hysterical cough, but have nothing new to suggest in their treatment. Very few of them require or are benefited by topical applications of any kind to the larynx, and must be treated on the general principles so well known to physicians, but it is very different with cases of hysterical aphonia. Some of these remain without improvement of voice for years, even after the general health has been regained. In these nothing but internal applications to the larynx seem to produce the slightest benefit. The two local applications I have used are solutions of nitrate of silver and electricity. With regard to the first I must repeat what I have stated in other papers, that such solutions, when properly applied, are good stimulants of the nervous supply, and consequently of the nutrition of the glottis. For these two things go together. An aphonic glottis is a poorly nourished one, and to improve the nourishment is to restore the natural use of the organ. After persevering for a time with this treatment, however, great help is obtained from electricity applied to the nerves and muscles of the glottis itself, by means of Dr Morell M'Kenzie's electrodes, which are the best for the purpose. I have not, indeed, met with such rapid cures as he and some others have done, but after a few applications of the electricity a marked improvement generally ensues. I need not give the details of cases in illustration of the above remarks. They are sufficiently common, and very like one another.

2. Affections of the laryngeal nerves from lesions internal to the nerves themselves are likewise common, but demand a more detailed consideration from their variety and importance.

I should divide them into the following sub-classes, ac-

cording as they are caused by (1st) tumours in the neighbourhood or involving the walls of the larynx or trachea; (2nd) ulcers of the pharyngo-laryngeal mucous membrane; and (3rd) foreign bodies in the windpipe.

1st. Tumours affecting the nerves of the larynx are very interesting. The common occurrence of enlarged cervical glands does not generally extend so deeply as to produce this effect, but I have known several such cases. I believe that enlargement of the bronchial glands more frequently leads to this result. In the Royal Infirmary I lately examined a case of this kind, in which the marked symptoms were severe cough with considerable weakness of voice. The laryngoscope displayed to us total paralysis of the left half of the glottis, and the only appreciable cause for this was a dulness on percussion, doubtless caused by enlarged bronchial glands at the upper part of the sternum. The organs in the chest were otherwise sound.

Still more recently Dr Charteris asked me to examine a case with him, in which very husky voice and violent paroxysms of dyspnoea and coughing had arisen within three weeks, but it ought to be remarked that the patient had had chronic bronchitis for a much longer time. There was a large gland in the neck which became projected upwards at every act of coughing, and its appearance dated from the time when the laryngeal symptoms began. I therefore connected the two together, and ventured on the diagnosis that the latter were dependent on the former; that the nervous affection of the larynx was due to the pressure of bronchial and cervical glands.

The glottis was seen in the laryngoscopic mirror red and congested, and very stiff and immovable. The mucous membrane over the right arytenoid cartilage was oedematous, and I had no doubt assisted materially in producing the attacks of dyspnoea.

This case obtained relief from inhalation of amyl-nitrite with steam, but he soon died from exhaustion, the laryngeal spasms becoming less as he became weaker; and, on inspection, it was found he had cancer of the pericardium and left

pleura, with great enlargement of the bronchial glands, the cervical gland which we had seen before death being continuous with them. The recurrent nerve was firmly grasped by this cancerous tumour, and the lining of the larynx was exactly as I had shown it to be during life by means of the laryngoscope.

I have at present another case under my care in the Infirmary, in which there was a large cystic bronchocele, and the symptoms, besides the weight and disfigurement of the external tumour, were dyspnoea in paroxysms and very loud barking cough. The glottis was congested, and moved very irregularly. I have no doubt that it was spasmodically closed at the commencement of the fits of dyspnoea, and that the cough was in great part a voluntary effort to clear an opening for the air. In this case I tried to puncture and inject the cyst, but failed, because of its depth and thickness. I then cut down upon it and opened it freely, stuffing it with carbolized lint. Slight suppuration ensued with great diminution of size, and though the wound is not yet healed, the dyspnoea and cough have both entirely disappeared.

Abscesses in the neighbourhood of the larynx produce nearly the same symptoms as has been well illustrated by Dr. Wm. Stephenson, in the October number of the "Edinburgh Monthly Journal," p. 312. I have seen several such cases as he describes, and in one of them the operation of tracheotomy was commenced, but in its performance a considerable abscess was opened, which gave the desired relief, and the trachea was not touched.

2d. Ulcers in the laryngo-pharyngeal membrane, especially if near to the glottis, often produce very serious effects on the nerves of that organ, and these effects are strangely different in different cases. About a week ago I saw a gentleman who had been recommended to me from Edinburgh and who complained of weak voice, attacks of dyspnoea and a peculiar cough, which last was not a very prominent symptom. On examining his throat with the laryngoscope, I found numerous follicular ulcers round the base of the

epiglottis, and a very relaxed state of the glottidean valves. My opinion, therefore, was that the nervous energy was deficient, and that the glottis was in a semi-paralyzed condition from that cause, and my advice was to have the ulcers cured by appropriate treatment, and then I have no doubt the glottis will resume its proper functions.

A good many years ago a lady was sent to me from the south of England, with ulcers in the larynx, which were cured by means of topical applications, but about three years thereafter she returned to me, complaining of an intolerable feeling, as if of itching in her wind-pipe, provoking the most annoying fits of coughing, without the least expectoration. The laryngoscope showed that the ulcers were quite healed, but I have little doubt that an alteration in the extremities of the nerves produced by the former disease had left behind this very disagreeable relic. I employed a variety of topical and constitutional treatment in this case, with the effect of greatly mitigating, but not altogether removing, the symptoms complained of, and I then recommended a period of travelling abroad. My advice was adopted, and the patient returned home quite cured.

In all such cases, more or less obviously, the diseased state of the mucous membrane appears first in ulceration, and then in an alteration of the nutrition of the terminal distribution (end-organs) of the nerves of the part. This is generally exhibited rather as want of force than in increase of it, but also, as I have just shown, at times in altered or morbid sensations, as well as actions. I put this the more pointedly because I think that this class of cases explains to us others to be described in the sequel in which there is no apparent lesion, but only the nervous change. That change has occurred either without the ulcers, or these have healed without observation, and left the less appreciable effect. Then as to the nature of the change, it may be called inflammation, or by any other name that implies depraved nutrition of the affected tissue, without the presence, or, at all events, the persistent presence, of the "*rubor et tumor cum calore et dolore*"; and this leads to the rational and success-

ful treatment of these cases, by clearly pointing to the restoration of the nutrition of the part and then of its nerves, as the course to be pursued. It is no doubt true that nervous agency is one of the essentials of healthy nutrition, and therefore it may be supposed that I have mentioned them in the reverse order,—that I ought to have said we must restore the functions of the nerves, and then the nutrition of the part supplied by them, but I submit that this is seldom, if ever, accomplished in practice. We must first affect the vascular element of the inflamed membrane with our local stimulants, which, by their direct action, contract the dilated vessels and assist in renewing the current of the stagnating blood. It is only after this has been accomplished that we can hope to reach the nerves, and to stir them up to a more natural performance of their function in the nourishment of the tissues. This, however, though second in point of time, is a very important effect of local stimulants, and it must be maintained until the nerves partake in the restoration of the part and can perform their function without it. Nor is it very difficult to see the reason of all this; for it is a molecular change which we have to combat, both in the membrane and in its nerves, and therefore the means which we employ must be such as to affect the cell growth, and to bring about a more natural assimilation, till health is reproduced.

Just as in the former set of cases, so in these, solution of nitrate of silver will be found the most effectual agent for promoting the first part of the transition indicated above. I know that it has become fashionable to disparage this remedy as unnecessarily severe, and as producing nausea and spasm of the glottis; but I can assert, after much experience of it and of most of the other agents which have been recommended, that there is no local stimulant for the mucous membrane of the throat at all to compare in efficacy with the solution of nitrate of silver, and that if properly applied it does not cause spasm, or pain, or any inconvenience, but a slightly disagreeable taste for a short time after its application. I do not think that electricity is at all so generally applicable in these cases, but there is a stage in

their progress when mere weakness remains, and when it will give great assistance in hastening the cure.

I am by no means inclined, however, to lay aside general remedies in the treatment of these cases, for they, by improving assimilation all over the body, must to a certain extent improve it also in the organ specially affected, and there are likewise nervous stimulants which tell through the blood on the whole system, and which ought not to be neglected. The chief of these, of course, is strychnia, which may be used in tonic doses, and gradually increased as may be required.

3d. Foreign bodies in the wind-pipe produce great local excitement, and frequent spasm of the glottis. I do not here refer to such large bodies as obstruct the wind-pipe and call for immediate laryngotomy or tracheotomy, but to much smaller ones, which pass down, perhaps, into the bronchi, and become lodged there. As these cases are interesting in many respects, and as the practice in them is doubtful, I shall relate the following two:—

On the 1st of February last, a stout, healthy child, about four years old, in sucking a programme card, in which a small ring was fixed for fastening a ribbon to it, managed to detach the ring and to draw it into the larynx during inspiration. The immediate effect was a violent fit of spasmodic cough, which failed to dislodge the ring. Therefore the fits of violent coughing, with urgent dyspnoea, were frequently repeated. Medical advice was sought, and the child was brought to me on the day following the accident. He was breathing noisily as if he had a croupy attack, and this was made much more obvious on listening with the stethoscope. But, besides these loud laryngeal sounds, there was no abnormality in the chest except at one spot under the left clavicle, where there were fine bronchitic rales.

I examined carefully with the laryngoscope, and was wonderfully successful in getting a good view, considering the age of the child, but no ring was to be seen in the larynx or the aryteno-epiglottic folds, where small foreign bodies

often stick. Neither could I feel any foreign body with the finger, or with the bent whale-bone rod which I use as a sound in such cases. The lining of the larynx was congested, and the glottis did not move freely, but nothing else was observed.

I therefore concluded that the small ring had passed down into one of the bronchi on the left side of the chest, and that though fixed there for the time, it so stimulated the branches of the pneumogastric nerve as to produce spasm of the glottis, which was constant to a certain degree, and convulsive at times, viz., during the fits of coughing. In my opinion, then, it was hopeless to attempt to grasp the ring with forceps, since it could neither be seen nor felt, and it seemed to me unnecessary to perform tracheotomy, because the spasms did not threaten life in themselves, and if the ring became detached from the bronchus, it could easily pass through the glottis into the mouth.

As the parents lived at Crosshill, and were usually attended by Dr E. Duncan, I advised them to have the child well watched by him, and to send for me if any urgent symptoms arose.

Dr Duncan writes me that the wheezing became general, but the coughs gradually less violent within a week of my seeing the patient. About this time the patient had measles mildly, and then became quite well, but the wheezing and cough continued for a long time. These eventually disappeared likewise, for when Dr Duncan visited and examined the chest, in the beginning of this month, he found no trace of bronchitis anywhere in the chest. The child was quite well, and, therefore, I suspect the ring must have been coughed up, though it was not noticed. It may have been swallowed.

The other case was that of a boy, aged fourteen, who was admitted into the Royal Infirmary on 29th April, under the care of Dr Robert Watson, who asked me to see the patient with him. He had swallowed, or rather inhaled, a hard dry pea. By the time I saw him, it had passed down and caused bronchio-pneumonia of part of the left lung, and

the usual spasmodic cough and dyspnoea. I advised occasional emetic doses of ipecacuan and chloroform, if necessary, for the spasmodic attacks. On the 6th of May he coughed up the pea which I saw, and then the symptoms all diminished, and he left the house well in a few weeks. I have been told that he has since died, but I do not know from what cause.

Besides these cases I have seen other two—one in which a small whelk was inhaled, and in which tracheotomy was performed without relief, and the patient spat up the whelk, five months after its inhalation, and after having suffered pneumonia. The whelk passed by the glottis, and not by the tracheal opening. In the other case the foreign body was a glass bead, and by waiting it was likewise in due time coughed up through the glottis.

I think these cases ought to establish the practice proper for this accident. At least they have settled my mind on the point that when the foreign body is small, and has passed into the bronchi, so as to be neither within sight nor feeling, no operative interference is needed in the great majority of cases. We must tide the patient through a stage of suppuration of some part of the lung, and then the foreign body will be loosened and spat up through the natural passages. Therefore our aim should be to diminish the glottidean spasms by inhalation of chloroform and of moist sedative vapours, as well as by rest in a warm and moist atmosphere; while at the same time we endeavour to localize the pneumonia as much as possible, by mild counter-irritants, possibly by leeching in some cases, and in all by soothing poultices or fomentations. Of course the general health and the diet must likewise be attended to.

3. I now come to the last division of nerve affections, which, for want of a better name, I have called internal or intrinsic affections of the nerves themselves. The most of these are very obscure, both in their nature and in their origin. I cannot, however, but conclude from the cases which I have studied, that many of them arise in the organ where the nerves are finally distributed, as an exten-

sion of the abnormal nutrition, which at some time has existed in the part.

Thus, in some cases of this kind, there is the history of a common cold or an attack of diphtheria, which has lingered for a time and then disappeared, leaving behind the nervous affection of the larynx. Of this, I have met with numerous examples. Only a few days ago, Dr Lawrie, of St George's Road, sent me a little patient of his, four years of age, who after an inflamed mouth and throat, from cold caught at the coast, became affected with fits of convulsive cough, somewhat like whooping cough, which, however, the child had formerly passed through and quite recovered from. Besides, there was no distinct hoop with the cough, but only great dyspnoea, especially at night, with loud gurgling noise in breathing, and profuse perspirations. He also fell asleep very readily, night or day, when the cough ceased, showing that his blood was not sufficiently aerated. His glottis was red, but not swollen, and its valves were rigid and almost motionless during respiration.

Again, after diphtheria, it is well known that palsy of part of the velum or fauces frequently takes place, and the same thing may be said of the glottis, though I confess such a state of that organ is less frequent than spasm in some of its forms, and I have in three cases of this kind been obliged to perform tracheotomy for intractable spasmodic closure of the glottis, long after all other relics of the primary disease had vanished.

In other cases, indeed, the connection between the irritating cause and the nerve affection is of a different kind. Thus, a young lady came under my care about a year ago, for a very remarkable hoarse barking cough, which resisted treatment till she passed a large round worm, after which it quickly subsided. In all such cases the laryngeal affection is truly sympathetic, i.e., it is an irritation of the nerves supplying the larynx at a distance from that organ, and is an interesting example of nutrition altered by such a distant cause, whose influence can be conveyed to the part *only* by the nerves. That the nutrition of the glottis is really altered in such

cases to a state of inflammation, is indicated by the symptoms as well as by the appearance and action of the organ, when observed in the laryngoscopic mirror.

In very many cases, however, the mystery is not so satisfactorily solved. There is neither previous disease nor local irritation to be discovered in them, but the nervous affection of the larynx is abundantly clear and often provokingly persistent. I have now before me the notes of three cases of this kind, one that of a well-known medical practitioner in a neighbouring county, the other two seen with medical friends in Glasgow. They were all of different ages, from 15 to 60, and all had nearly the same symptoms, of which the most prominent were dyspnoea, and fits of spasmodic coughing. In fact, their symptoms greatly resembled those of the disease commonly known as hay fever, only the fever and the sneezing were absent. Yet, I believe, hay fever is just a variety of this same affection of the pneumogastric and glossopharyngeal nerves, and I would therefore make one great class of all such cases, noting, however, that in some the explosive expirations are of the nature of coughs, while in others they are sneezes, the difference being very slight and depending on the participation of the palato-pharyngei in the nervous excitability.

In characteristic examples of this disease, the glottis is seen to be red and congested. It moves with difficulty at all times, and never fully opens for the ingress or egress of air, and during the paroxysms it is firmly closed and slightly opened in rapid succession, causing the peculiar coughs or sneezes which characterise the complaint.

Here, then, is a class of cases in which the symptoms are attributable to a nervous lesion, pure and simple, but when they are compared with the cases previously related, in which the same nervous symptoms were connected with and apparently caused by some change of the mucous membrane or other obvious cause of irritation of the nerves, I think it will become clear that the former set of cases have the same origin as the latter, but that in them the primary lesion had

disappeared, leaving the nervous affection alone. Nor is this a matter of merely pathological interest; it is of much practical importance, for I am convinced that on this theory alone can such cases be treated with any reasonable hope of success.

We can only affect the extremities of the nerves through the membrane in which they are distributed, and it is, therefore, to it that we are in the first place to direct our remedial efforts. And here I must observe that though there is neither ulcer nor tumour, nor other obvious lesion to be seen, yet there will be found in most, I should rather say in all cases of what is apparently quite a pure nervous affection of the larynx, great failure of nutrition in the mucous membrane. Thus it will be seen by means of the laryngoscope to be thin in some places and congested in others; and the mucus secreted by it is both scanty and thick, coming up to the mouth in masses, and not spreading itself on the membrane as its natural protector and lubricator.

In these circumstances the best thing to do is to apply a gentle and equable stimulant to the bloodvessels of the larynx, such as solution of nitrate of silver, not too strong, perhaps gr. 10 to the ℥i. of water. By this means the congested spots are removed by the contraction of their dilated vessels, and the pale, thin parts are quickened to greater nutritional activity. In fact, the circulation is made more equable, and the nutrition of the tissue more full and regular. Then as an immediate consequence of this change, the mucus becomes more natural, and affords a better protection to the delicate membrane beneath, while the very topical application of the remedy, by accustoming the larynx to an unnatural stimulus at times, diminishes its excessive sensibility, and enables it to bear the natural stimulus of the air in breathing, and the motions of the glottis in speaking, without that excitement which constitutes the disease.

While this is being accomplished, however, other means may be employed with advantage, such, for instance, as

soothing inhalations. The most potent of these is made by adding a little chloroform and rectified spirits to boiling water, the steam of which may be inhaled; or, if this sickens, the amyl nitrite may be used, or the compound tincture of benzoin. In some cases, on the other hand, the cold spray of a solution of alum or borax is very useful in allaying nervous irritation. This is especially true of cases where there is much congestion or relaxation of the laryngeal lining, or as a protection against cold, if the patient has to go out during treatment. In these cases it is often necessary to insist on the employment of a respirator.

I have found mild and continued counter-irritation over the thyroid cartilage specially useful in this class of cases. I seldom blister, but generally prescribe the iodine liniment to be painted on the skin once or twice a day, changing the side when the pain becomes considerable.

I may mention here that the general remedies from which I have seen most benefit in the cases referred to, are bromide of potassium, and the preparations of iron, and these may often be advantageously prescribed in short, alternate courses, of two or three weeks at a time.

If all these measures fail, and they sometimes do from various causes, I believe there is nothing so likely to do good as a short residence abroad. Of course this can only be recommended in cases where it is known that the patient's circumstances permit of his complying with the advice. I do not, however, believe much in the efficacy of spas or mineral waters, but I confess that I have great faith in thoroughly changing the patient's mode of living, and in the exercise taken by him under more favourable climatic influences than our island affords, which are implied in such a recommendation.

III.—ON THE SOLVENT ACTION OF PAPYA JUICE ON THE NITROGENOUS ARTICLES OF FOOD.

By Assistant-Surgeon G. C. Roy, M.D., F.R.C.S.; Corresponding Member of the Glasgow Medico-Chirurgical Society.

(Read before the Society, 5th September, 1873.)

BASING my experiments on the strength of a popular belief in India, I have arrived at results which are well worth recording. These beliefs, though originally started and practiced upon by the ignorant mass, are often pregnant of wholesome truths. To ignore or overlook them altogether is detrimental to the progress of science. For it was upon the evidence and experience of an ignorant body of milkmen that Dr Jenner brought to light the protective influence of cow-pox in the human system.

It is the practice amongst the native cooks in India to add a few drops of the milky juice of the plant under consideration to tough old meat, to make it tender and supple. Four years ago, anxious to ascertain whether any such virtue really existed in the plant, I added a few drops of the fresh juice to a pound of minced goat's meat, and stewed it over a slow fire. To my surprise, the whole ran into a diffuent mass in five minutes, owing to a larger quantity of the juice having been used on the occasion than is necessary to make it tender and eatable. Since then I had no further opportunity to test its property until I went to England, when I carried with me a quantity of the juice obtained by incising superficially the unripe fruit, and drying it in the sun. Through the kindness of Dr Parkes, the esteemed professor of Netley, I was allowed the opportunity to carry on the experiment.

The plant belongs to the natural order *Papayacæ*, and is termed *Carica Papya*. It is indigenous to tropical climate, and has a rapid growth, consisting of an unbranched stem from ten to twelve feet high, surmounted by large, deeply palmated stalked leaves. The fruits or pepos are edible both in their ripe and unripe state. The former is used as dessert, and the latter cooked as vegetable. The fruit is

about the size of a melon, with a green rind, enclosing a sweet, delicious pulp, in which innumerable seeds, about the size and appearance of black pepper, are imbedded. The plant grows extensively in Bengal and over all India, and bears fruit in one year.

Incisions on the stem, or breaking off the leaf from its joint, yield a few drops of this milky juice, but an abundant flow of it can be obtained by scarifying the unripe fruit in the same way as the poppy capsules are treated. The fluid is liable to decompose, especially in hot weather, if kept over for a few days, and hence it should be dried in the sun in shallow dishes, and stored for use. One ounce of the juice can be obtained in an hour's time from the fruits of a vigorous plant. The dried stuff is of a yellowish white colour, hard, friable, and has a peculiar smell. Two drams of this beaten up with one ounce of water will, I believe, give the approximate proportion of strength of the original liquid. At the risk of being tedious, I will give the details of the experiment as they were noted down at the time.

April 30th—thermometer 66 deg.—The juice was obtained on 20th December, *en route* to England. A solution of it was made of the strength of 1 gramme to 3 c. c. of distilled water. Two pieces of fresh lean of beef, each weighing ten grammes, were taken and finely minced. Whilst to the one 10 c. c. of distilled water were simply added, to the other 1 c. c. of the made-up solution was mixed up with 9 c. c. of distilled water and added also. Both cups boiled for five minutes. The medicated portion became soft and half dissolved in the fluid, whilst the other dish remained tough and unchanged.

Another piece of the same meat, of the same weight, was moistened in lump with 1 c. c. of the solution, and kept over for next day's observation.

1st May—The superficial portion of the lump was soft and gelatinous, making the piece very slippery to the touch. When cut up into pieces, and a little more water added, the whole became pulpy in an hour's time, without the aid of heat.

The animal was killed on 28th April, the thermometer standing at 66°.

Another experiment which was made the same day to confirm the result was equally successful.

Two of the cups, medicated and unmedicated, were kept under cover by Dr Parkes, to note whether the solution had any power to retard decomposition.

2nd May—Decomposition had commenced in both the vessels, but it was more advanced in the cup with papya solution.

27th May—A fresh solution was made (1 gramme to 20 c. c. of water), and the following experiments were tried:—

In four separate dishes, beef, hard boiled white of egg, freshly prepared moist, gluten and arrow-root, each 10 grammes in weight, were treated with 2 c. c. of the solution by 8 c. c. of distilled water. To make a standard for comparison, the same articles, of similar weight, were digested in four more dishes, with 10 c. c. of distilled water only. The whole kept over till next day, without heat.

28th May—The dish of meat with papya soon became gelatinous on being stirred with a glass rod. The albumen of egg was soft, and when mashed, broke into a uniform pulp. The gluten specimen was soft on the surface, and its superficial layer dissolved in the fluid, giving it a slight turbidity. Arrow-root was dry and visibly unchanged.

The dishes with water were unaffected. The meat fibres remained without change. The egg, when broken up, remained lumpy. The gluten was clear, and even when it was worked up with finger, did not give the liquid the least turbidity. Arrow-root dish was moist, but without any change.

It should be remarked that the dish of meat and of albumen contained more fluid than the corresponding ones with water, whilst the arrow-root dish, which was unaffected in both instances, was dry in one and moist in the other.

All the dishes were preserved for further test.

29th May.—Both the dishes of meat were eaten away by a cat, which grew exceedingly fond of it. The whole of the

gluten was dissolved in the solution, whilst the dish with water was yet unchanged. Each of the cups was mixed up with 50 c. c. of distilled water, and left over for next day.

30th May.—The cups filtered for test. The two arrow-root solutions gave no reaction when tested with Fehling's Solution for sugar.

The drugged albumen was fast undergoing decomposition, and had an offensive smell. When filtered, nearly the whole of it passed through. The filtrate was clear and decidedly acid. It gave no precipitate with heat, or heat and nitric acid, or ferrocyanate of potash.

The watery specimen of albumen, when filtered, left behind a quantity of residue. The filtrate was milky in colour and neutral in reaction, and gave a slight precipitate with each of the reagents.

The specimen of gluten solution in papya passed through the filter, leaving merely a trace behind. The solution was tolerably clear and acid, and gave an abundant precipitate with heat. More than $\frac{1}{4}$ was coagulated with heat and nitric acid, and some flocculi formed with ferrocyanate of potash. The precipitate, with heat, was insoluble in liqr. potassæ.

In the watery dish of gluten very little was dissolved. The lump was still sticky. The water solution was clear and strongly acid, and gave no precipitate with any of the reagents. Nitric acid made the solution clearer than before.

3rd June.—Solution of the strength of $\frac{1}{2}$ gramme to 10 c. c. of water. As this was kept over for some days before use, it was found to have lost its acid reaction, and settled itself into two parts—the clear liquid above, and a sediment below. The clear supernatant liquid gave the same reaction with a piece of meat, showing that the solvent agent was soluble. A standard preparation of meat with water was made at the same time.

.5th June.—Both the dishes were mixed with 50 c. c. of water, and left to filter through.

8th June.—The papya dish was somewhat advanced, whilst in the watery dish there was no sign of putrefaction.

10 c. c. of the papya filtrate was dried in a porcelain crucible in a hot air bath, and 10 c. c. of the watery filtrate was treated in a similar way. The quantity of solid dissolved out in the papya filtrate weighed 2 grammes, whilst in the watery filtrate it was .09 grammes.

Another equal quantity of each filtrate was tested in a test tube with heat and nitric acid, and it confirmed the result that the albumen dissolved out in one was more than double the quantity in the other.

A piece of gelatinous meat, as changed by papya juice, was examined next day by Dr Welsch, under the microscope. It swarmed with vibriones in active motion. As for the muscular fibres, the disintegration was complete, and those fasciculi that were yet entire were just separating themselves into ultimate particles. The digestion could not have been more complete.

As very little solid stuff was left for further research, the remnant was reserved for chemical analysis.

A solution of the strength of 1 gramme to 30 c. c. of distilled water was prepared and filtered. Reaction distinctly acid. A portion was boiled to dryness in a crucible. The vapour did not redden litmus, but the concentrated solution became more strongly acid, and remained so when thoroughly dried. A little more heating charred the side of the capsule. When incinerated the ash gave an alkaline reaction. A deep precipitate on boiling. The coagulum was strained, and a portion treated with the following reagents. Nitrate of silver gave a white precipitate soluble in ammonia and acids; no precipitate with chloride of calcium, cold or boiled; no change of colour with perchloride of iron; a white cloudy precipitate with liqr. potassæ; some precipitate with chloride of barium.

Remarks.—The above experiments in detail conclusively show the solvent action of the juice on all nitrogenous articles of food. Its effect in making the meat tender has been noticed in several botanical works, East and West Indian, but, so far as I have been able to find, no systematic experiment has been made up to the present to test its

virtues medicinally. Some have contented themselves in merely mentioning the practice of the natives as alluded to above, and some West Indian authors ascribe to the plant the power of hastening decomposition in dead animals—so much so that they go the length to assert that a joint suspended under its branches will fall to pieces when cooked. Nay, the belief in the West Indies is so strong, in its power of hastening decomposition, that it is said that live animals fed on the unripe fruit will not keep long after death.

That there is a considerable power of disintegration inherent in the plant is established beyond doubt and cavil. But the question is, what is its peculiar nature? Is it chemical or dynamical? Is it, like the yeast, a fermenting agent, the presence of which in dead animal substances destroys the stability of their composition; or, are the solution and disintegration allied to natural digestion, and the results of chemical change? If the former, there is a valuable discovery of a nitrogenous ferment, which stands in the same relation to protein compounds as yeast does to starch. The conversion of insoluble starch to soluble substances constitutes the process of digestion of amylaceous principles of food in our mouth, and this conversion is chiefly assisted by an animal ferment, Ptyaline, that exists in saliva. The digestion of nitrogenous principles is mostly a chemical process, in which the gastric juice plays an important part. The rapidity and completeness with which the papya juice acts on meat, when aided by high temperature, surpasses all digestive processes on record. The smallness of quantity used to bring about the change negatives the assumption of any caustic virtue in the plant. Besides, I have put the juice on my tongue, and applied it to the skin without any irritant effect. I was at first inclined to believe the solvent action as due to some fixed organic acid, either tartaric, citric or malic, as will be seen from the records of analysis, but I have failed to arrive at any determined result. The disintegration takes place too soon to be the effect of mere putrefaction. The moving vibriones observed under the microscope were no doubt generated by keeping, and were

not the cause, but the effect of disintegration. In all putrefactive changes these are looked upon as the initiators. But inasmuch as the boiling temperature which destroys the existence of vibriones hastens this peculiar change, it is fair to suppose that the solvent action is something different from putrefaction. Besides, no reagent has yet been able to bring about putrefaction in fresh meat, in five minutes. The fruits in their ripe and unripe state are edible and quite harmless.

The digestive agent is not acid, for its reaction is too feeble, and even when long keeping makes it ammoniacal and neutralizes the acidity, it yet retains its peculiar virtue. The solvent principle is soluble in water. Coagulated albumen dissolved by it will not coagulate again with heat acquiring the property of albuminose; gluten is thoroughly dissolved, and can be re-precipitated.

The whole action is so identical to healthy digestion that I wonder we have not availed ourselves of this medicinal property, in cases of invalids and dyspeptics, to substitute a process of artificial digestion.

A few grains taken immediately after a meal will substitute the power where it is wanting. I have not tried it in any case internally, but from its effect on the cat, which grew so fond of it that it became a task to prevent its depredation, I believe it is harmless. My attention was also directed to discover whether it could be utilized in preparing soluble meat or something like a liquid extract, but its liability to decomposition is a bar to its use. Further investigations are yet wanting to establish its repute, but, as far as they have been gone into, the result is highly encouraging. I intend to resume my operations as soon as I am relieved of my present arduous work, which leaves no time for experiment.

IV.—CASES OF DISEASED ELBOW-JOINT, TREATED BY EXCISION, ACCORDING TO THE ANTISEPTIC SYSTEM.

By ANDREW MARSHALL, M.D., *Hon. Med. Officer to the Preston and County
of Lancaster Royal Infirmary.*

CASES of diseased joint, in which one or more old putrid sinuses communicate with the articulation, are unfavourable for the practice of antiseptic surgery; because, however carefully these passages may be injected with solution of carbolic acid or chloride of zinc, it is, so far as my experience goes, very difficult, or next to impossible, to thoroughly disinfect them. The extent and intensity of the putrefactive process may, however, be diminished by antiseptic applications, and the deleterious influence of noxious emanations prevented by surrounding their source with antiseptic dressings. But the most favourable conditions exist in cases requiring excision where there is no external wound, and in such the antiseptic method may be adopted with the greatest confidence, and almost with absolute certainty of success; the only essential requisites being, a due appreciation of the principles of the treatment, and a faithful application of its details. During the last three years, three such cases have been admitted into the Infirmary under my care, and the benefits of the antiseptic treatment have been fully realized in all of them. The first was that of a woman who had ankylosis of the elbow-joint from old disease, due apparently to rheumatism. The arm was fixed in the extended position, so that it was really of very little use to her. She was consequently unable to earn her own living, and was dependent on the parish for support. Excision was performed antiseptically, and ever since her recovery she has been in constant employment, and makes a very good income by "driving three looms."

The second was that of a boy, aet. 12, admitted into the Infirmary in March, 1871, with a stiff elbow-joint, due to an old unreduced dislocation. Flexion, pronation, and supination being impossible, the limb was comparatively useless. Excision was performed, as in the last case. No suppura-

tion occurred. Eight days after the operation the wound was perfectly closed, and during the progress of the case there was neither local nor constitutional disturbance.

I have no notes of the first case in my possession. An account of the second was published in the *British Medical Journal*, and subjoined is a report of the third, taken principally from notes, made during the progress of the case, by Dr Blair, the Senior House Surgeon.

April 2nd, 1872—Mary Jane Pownall, aet. 18, a weaver, was admitted into the Infirmary to-day, with disease of the right elbow-joint. She states that her father died of phthisis, and one brother of bronchitis. She always enjoyed good health previous to a very bad attack of enteric fever, from which she suffered four years ago. Three months afterwards, she became an out-patient, at the Old Dispensary, for abscesses in the right axilla, from which she perfectly recovered. She then became engaged as a domestic servant, and followed that employment until about a year ago, when she went to work in the mill. Her health continued good up to the beginning of last December, when she began to suffer pain in her right elbow, which was very much increased by attempting to lift anything. At night, she used to bathe the joint with hot water, and wrap it in flannel. The pain was always worse in the evening, and frequently kept her awake all night. She was obliged to give up her work altogether at the beginning of March. She did not consult any medical man, but continued to foment and bandage the limb until the present time, when she made application at the Infirmary.

The arm was flexed and painful, and any attempt at motion, either active or passive, greatly aggravated her suffering. The part was so swollen that the natural configuration of the joint was entirely lost. There was no history of any injury. The patient had been gradually losing flesh for the previous three months. A week before admission, she had a distinct rigor. Her face was pale, rather sallow, and puffy. She was troubled with profuse night perspirations; had no cough; but the respiration was

feeble and somewhat tubular beneath the left clavicle. There was no dulness on percussion. No albumen in urine. Catamenia regular. The arm was placed on a wire splint, and thus maintained at rest in the position it had assumed. Hot fomentations were applied to the joint. The patient was ordered full diet and 20 minims syrupus ferri iodidi, with a teaspoonful of cod liver oil, three times a day. This treatment was followed up till April 28th, when the condition of the patient was in no ways improved. The limb was more swollen than on admission, and the pain very severe. In consequence of an attack of dysenteric diarrhoea, the medicine was discontinued, and an astringent mixture ordered by Dr Blair, which immediately relieved her of that complaint.

On the 1st May, patient complained very much of the pain in her elbow and loss of appetite. She was ordered to have beef-tea, four ounces of wine daily, one eighth of a grain of morphia by subcutaneous injection at bed-time, and a dose of quinine and acid mixture three times a day.

On the 10th, as there was no perceptible improvement in the patient's condition, she was put under chloroform, and the actual cautery freely applied over the posterior aspect of the joint. The limb was then replaced on a wire splint, the sore dressed with carbolic oil, and $\frac{1}{4}$ of a grain of morphia ordered to be given at night by hypodermic injection. The patient had an hysterical fit soon after the operation.

On the 5th July last, the wound made by the cautery had entirely healed. The pain being as severe as ever, and the patient's health deteriorating, excision was determined on. The joint was, therefore, well washed with carbolic lotion (1-20), a single longitudinal incision made over the posterior aspect of the joint, under carbolic spray (1-100), and the articular surfaces removed. Very little hæmorrhage ensued. The wound was dressed in the usual way with Lister's antiseptic gauze. The cartilages were not ulcerated, but almost detached, so that they could be easily peeled off from the bone, which was rough and porous. The patient

had an hysterical fit after the operation, and subsequently suffered from sickness, for which she was ordered ice. One-fourth of a grain of morphia was injected at night. The subsequent course of the case it may be as well to give as noted from day to day.

July 6th.—The patient has no pain. Wound dressed to-day, discharge profuse and bloody.

7th.—Wound dressed, discharge less copious. Patient complains of pain in the bowels, which have not acted since the operation. An aperient ordered.

8th.—Wound again dressed, discharge very much less. No pain.

10th.—Wound dressed, rather more discharge. No putrefaction.

11th.—In consequence of there being rather more discharge yesterday, the wound was dressed again to-day.

13th.—Arm put on an angular splint. Patient got up against orders and went to the water-closet.

14th.—The patient complained of pain in the left inframammary region; on auscultation a faint friction sound was detected. Hot poultices and morphia injections ordered.

15th.—Wound completely healed up, a superficial granulating sore only remaining. The arm was extended, and flexed, and replaced on the splint.

16th.—In the evening, patient flushed, complains much of pain in the side. Pulse, 140. Respiration, 40. Temperature, 102. The friction sound still heard. Nothing else abnormal. Morphia and poultices to be continued.

18th.—Patient much easier.

19th.—Patient still improving. Side strapped with belladonna plaster. Iodide of potassium, 3 grs., to be taken three times daily.

24th.—Passive motion is practised every day, flexion and extension are perfect. The pain in the side is almost gone, and the friction sound cannot be heard.

August 3rd.—Pronation and supination can now be performed as well as flexion and extension.

This young woman came to see me a few weeks ago. She enjoys as good health now as ever she did. She drives three looms as she was accustomed to do before she had the disease in her elbow; has got married, and is about to become a mother. As an illustration of antiseptic surgery, this case speaks for itself. Comment is unnecessary.

V.—REPORT ON RENAL CASES, OBSERVED IN PROFESSOR GAIRDNER'S CLINIQUE DURING LAST SESSION (1872-73).

By JAMES FINLAYSON, M.D, L.R.C.S.E., *Fellow of the Faculty of Physicians and Surgeons, Glasgow: Assistant to Professor Gairdner's Medical Clinique; and formerly House-Surgeon to the Manchester Clinical Hospital.*

DURING last session, an unusual proportion of renal cases occurred in the wards, and this directed some special attention to the study of such affections. The cases seem, therefore, worthy of record; partly on account of the unusual character of some of them, and partly on account of the interest which arose from the various groups being studied and recorded by the Professor in some detail. At the end of the paper will be found a list of the cases which form the basis of this communication, and in dealing with them the more exceptional diseases will be taken first.

EMBOLISM OF RENAL, CEREBRAL, RADIAL, AND PROBABLY OTHER ARTERIES.

No. 19. Jane W., aet. 22, was admitted to the Infirmary on April 1, 1873. It is not often that a diagnosis of renal embolism can be made during life, although the lesion is frequently found in the dead-house. This patient, however, presented such a concurrence of evidence in this direction, as to seem to Dr Gairdner to put the matter almost beyond a doubt; very fortunately she was able to be dismissed comparatively well, so that *post-mortem* proof is necessarily deficient.

She was admitted with a distinct history of articular rheumatism, and with some remnants of her last attack still discernible. The heart was obviously affected, the precordial dulness was increased, the impulse was unduly diffused, and

a very loud rough murmur had its seat of maximum intensity at the apex. The murmur both preceded and followed the first sound, so that the diagnosis of mitral disease was clearly established. *The urine on admission was normal.*

On April 10, some degree of paralysis of the left leg, the left arm, and the left side of the face was detected; the tongue was likewise protruded to the left. The hemiplegia was never very extreme, and passed away satisfactorily.

On April 25 there was a severe rigor in the morning, lasting about half-an-hour, followed by profuse sweating; there was pain in the *left* side of abdomen, and this was much increased on pressure being made over the left renal region. The urine was rather scanty and had a large deposit of lithates; it was now found to contain blood and much albumen. No casts were discovered on the first examination, but, as will be shown afterwards, these were present in the next specimen.

On May 10 another severe shivering occurred, and both before and after this several slighter shiverings occurred always associated with an exacerbation of the pyrexia.

On May 15 the right radial artery could not be found beating, although it pulsated strongly on admission, and tracings had been taken from it by the sphygmograph. The defect was traceable up to the elbow. During the stay of the patient this pulse remained extremely feeble, although it subsequently became perceptible. No special pains could be associated with this occurrence, as the existence of rheumatic pains obscured the history. Even before the first rigor there was some degree of evening febricula, the temperature being usually about 100° F. or upwards in the evening. For six days after the rigor the morning temperatures were also elevated (100°. 5 to 101°. 5) with a continued tendency to evening exacerbations.

On May 29 sudden pain in the *right* lumbar region came on after the patient got up in the morning. The pain was followed by shiverings which were severe for about half-an-hour, and feverishness and sweating with some sickness likewise occurred. On the next day the pain seemed to

have shifted more towards the front of the abdomen; no tenderness over either kidney could be made out. There was no marked disturbance in the character of the urine in connection with this attack.

On June 6, there was another shivering with abdominal pains leading the patient to lie with her legs drawn up; and on June 26 another severe shivering, with feverishness and perspiration, and some slight pains in the lower and left portion of the abdomen likewise occurred, without any urinary changes being observable. The abdominal pains were always relieved by fomentations or by turpentine stupes, and a variety of internal remedies were tried from time to time without much benefit, at least, of a marked character, but the patient went out on July 19 to go to the country. During her stay in hospital there was no trace of dropsy.

The urine passed immediately after the shivering, which was associated with the pain in the left renal region, contained much blood. The blood-tinge continued in the urine for about a week, and during this period the quantity was small and the specific gravity was high (1030-1037.) There was also always a deposit of urates. During this period, too, tube casts, some epithelial and some granular, were found in considerable abundance. In about ten days after the rigor the urine was of normal colour, but still contained a quantity of albumen, and the sediments were often typical of the oxalate of lime deposits. At this time also pus was revealed in considerable quantity on microscopic examination, and its presence as a sediment was sometimes perfectly distinct to the naked eye. On a few occasions tube casts enclosing pus corpuscles (pus casts) were also demonstrated. From this time (May 19) the albumen became almost absent, sometimes not even a trace could be found, but usually its presence could, with care, be detected. The purulent deposit also disappeared, and pus corpuscles were found either in small number only or not at all on microscopic examination; from time to time one or two hyaline casts were found on a careful search being made, and this continued even up to the

time of her leaving the ward. On one occasion (June 10) stellar crystals of phosphate of lime were found. The reaction of the urine throughout was acid, and after the first few days the specific gravity was normal, and never became low. During all the febrile attacks, except the first, no urinary changes of a marked character could be detected in relationship with them, a very slight increase in the quantity of albumen and a certain turbidity from urates being the most marked deviation noted (May 29).

Remarks.—Rayer was, unquestionably, the first to distinguish the form of renal lesion, which is now more accurately known under the name of embolism, and which the French pathologist described and figured as “Néphrite rhumatismale.” The admirable coloured plates in his great works (*Maladies des Reins*, atlas; Pl. v., figs. 2, 5, 6, 7), and the descriptions in Vol. II., p. 73, *et seq.*, leave no doubt that Rayer had clearly observed and noted the special characters and course of the patchy deposits, now recognized as due to plugging of the renal arteries, and also their association with cardiac valvular diseases and rheumatism, as early at least as 1831. It was, however, reserved for Virchow and Kirkes to develop the pathology of fibrinous arterial obstruction into a consistent system of doctrine, and to show the identical origin of lesions in the kidneys, spleen, brain, &c., arising from detached fragments of fibrinous concretions formed in the heart, or in the course of the pulmonary circulation. The clinical aspect of these cases, however, is still in want of illustrations, and neither in Rayer's work, nor in the more modern writings on the subject, are there to be found materials for a good history of the symptoms associated with renal embolism. Dr Gairdner has himself observed a certain number of cases ending in recovery, where hæmaturia (sometimes considerable) has occurred in the course of, or succeeding, rheumatic attacks, and where the blood in the urine was associated with debris from the tubuli uriniferi, sometimes with pus, and often with tube-casts; and in a few similar cases, not of rheumatic origin, he has been disposed to attribute to the renal lesions a similar pathology, or at

least to distinguish these cases from Bright's disease, by the absence of dropsy and uræmic symptoms, and the frequently natural specific gravity, and only slightly diminished quantity, of the urine. Traube communicates a case in which he was correctly led to this diagnosis during life. (*Über den Zusammenhang von Herz und Nieren-Krankheiten*, 1856, p. 77), but the urine of his patient was not albuminous. Dr Murchison (*Med. Chir. Transactions*, vol. 47, 1864, p. 136) narrates the symptoms in the case of a man operated on by the insertion of wire into a thoracic aneurism; amongst other things, frequent severe rigors occurred, and before death the urine was loaded with albumen, although it had been found to be non-albuminous a few days before the operation. The patient died 4 days and 20½ hours after the operation. "Both kidneys contained a number of circumscribed abscesses, varying in size up to that of a small pea, and containing characteristic pus corpuscles. A cluster of six of these small abscesses was found at the apex of the left kidney. Each abscess was surrounded by a zone of vascular injection. In the cortical substance of both kidneys a number of patches of yellowish deposit of larger size, but less defined outline, were also observed." Dr George Johnson (*Brit. Med. Journal*, May 24, 1873) says, "We may suspect the occurrence (of embolism) when, with the physical signs of aortic or mitral disease, without great impediment of the general circulation, the urine suddenly becomes albuminous or bloody. In some cases extensive embolism in one or both kidneys has been attended with severe lumbar pains, a scanty secretion of urine and vomiting." From the morbid anatomists we learn that "the disorder sets in with intense hyperæmia, "which waxes till blood is actually extravasated into the uriniferous tubes. The extravasation occurs, as a rule, in the centre of the deposit, hence the latter, when recent, presents a central nucleus of a deep red hue, with blurred edges, like a flea-bite in the skin. At a later period, the centre becomes yellowish-white, suppuration has begun and leads to the formation of an abscess." (*Rindfleisch, Pathological Histology*. Vol. II., p. 160).

From these statements it will be seen how well the case of Jane W., No. 19, corresponds with the symptoms to be expected. With a lesion of the heart well calculated to give rise to embolism, she presented signs of arterial plugging both in the cerebral and radial branches. The urine, which had been normal, became highly bloody immediately after the rigor and the paroxysm of lumbar pain associated with it, tube casts were thrown off, and as the hæmorrhagic stage subsided pus appeared in the urine. This corresponded, no doubt, to the stage of suppuration found in Dr Murchison's case (5 days after the accident), and described by pathologists as constituting the second process. The pus also gradually diminished, and the urine by-and-bye became nearly normal. The only difficulty seems the persistence after this of slight albuminuria with hyaline casts, but in the zone of congestion beyond the infarctions (described, for example, in the passage quoted from Dr Murchison's report), we seem to have, according to pathological authorities (Klebs), ample scope for all degrees of inflammatory disturbance in the adjacent renal tissue. [In connection with this case, see also Case No. 14, Grace Y., and remarks at page 62.]

DOUBLE HYDRO-NEPHROSIS.

No. 44. William S., æt. 43, ploughman, admitted June 28, 1873, died July 11. This case was obscure as to its history. The patient had lived in a remote district in Arran, and had not been under close medical supervision. He had been laid up for about twelve months, three years before admission, from the effects of an injury to his leg, due to the kick of a horse. This illness seemed to have been serious and protracted, and the cicatrices were large and distinct, but no dead bone seemed to have separated. Five months before admission, he had another serious illness which confined him to bed, and convulsions were said to have occurred at this time. Shortly before admission there had been œdema of the legs and feet, but this had just disappeared. His chief complaint was of incontinence of urine, of swelling

in the belly, and of pain in the back. The swelling in the abdomen had existed apparently for about a year, and seemed to have given him little or no direct discomfort. It was found to be a distended bladder. On its being emptied by the catheter, some sense of tumour and resistance still remained, as also some dulness on percussion, so that Dr Gairdner concluded that the bladder itself was thickened and enlarged. The urine, as first examined by two of the clinical clerks separately, was recorded as having only a sp. gr. of 1001. Subsequent samples gave a sp. gr. of 1009 and 1010, without any marked sediment, but giving distinct evidence of albumen. Under the microscope, oxalates, mucus, and granular cells were found. The bladder was emptied on the morning of July 1, when 61 oz. were drawn off. Within 24 hours other 78 oz., at least, were passed naturally or by aid of the catheter. Although the bladder had been emptied at half-past eight a.m., two hours later it was found again prominent, and 18 oz. were then removed. An effort was therefore made to keep the organ from being distended; but although no stricture existed—the instrument passing with perfect ease, and nothing abnormal being felt *per rectum*—the use of the catheter caused some bleeding. This obscured the subsequent examination of the urine, and, indeed, led to the abandonment of frequent catheterisation, as other signs of disturbance became manifest. The urine ultimately became alkaline and somewhat purulent: the quantity diminished to about 20 oz. from a previous average of from 40 to 60 oz. Nervous symptoms appeared—vomiting, hiccup, and twitchings. Coma supervened, and he died on July 11.

No complete inspection could be obtained *post mortem*, but the urinary organs were removed and examined. The bladder was found very much enlarged. Its walls were hypertrophied, and the mucous membrane congested and thickened. There was no obstruction at the outlet of the bladder. Both ureters were dilated to the size of a man's finger, and both kidneys had become little more than mere sacs—very little secreting tissue being left.

Remarks.—The renal mischief seems in this case to have originated from the distended bladder. This may have become affected through neglect in the early part of the illness, *i.e.* three years before admission. The absence of the general features of Bright's Disease, the presence of obstruction in the form of a distended bladder, and the low specific gravity and variable abundance of the urine, all led to the suspicion of Hydro-nephrosis; and the previous history of convulsions seemed to call for a bilateral lesion on this hypothesis. Careful examination of the renal regions completely failed to show any tumour in this situation, so that the diagnosis had to be left in doubt.

PYELITIS AND PYO-NEPHROSIS.

There were two cases (Nos. 42 and 21) which came under these headings, but neither of the patients remained long enough to afford much instruction. Robert F., *æt.* 60, had had hæmaturia a year before admission, and there had been occasional recurrences of this since then. Three months before admission, he began to suffer from violent pains in the back and in the lumbar regions: these extended also to the right hip, and to the inner aspect of the right thigh; but latterly they had become less severe. No tumour could be felt in the abdomen, and there was no tenderness or pain over the bladder. The urine was acid, and its *sp. gr.* ranged from 1009 to 1024. It contained a little blood and a considerable quantity of pus.

Mrs MacL., *æt.* 33, had suffered for about eight years from painful and frequent micturition, and from pains extending from the right hip to the hypogastric region. There had been an aggravation of the illness during the preceding five months, and the illness seemed to have been complicated by an attack of pleurisy on the right side. For three months she had noticed a fulness in the right lumbar region. On examination, this swelling was found to agree in situation with the position of the right kidney. There was dulness on percussion over this region, and a sense of impact on applying pressure by one hand behind and the

other in front. There had been occasional vomiting, and there was, during her short residence in the ward, a distinct tendency to evening febricula (Temp. in evening, 100° to 102°). There was no affection of the limb on the diseased side, and there had never been any lameness.

The urine, in this case, presented a very typical character. Soon after it was passed it became ammoniacal in odour and alkaline in-reaction, but when examined immediately after it was passed, it was always acid. The sediment was generally large, and consisted, obviously, of pus, associated, usually, with more or less blood; in one sample, however, very little pus was deposited. In 5 samples passed in succession (on July 23) the proportion of pus in each was about the same, but although all had a blood tinge there was only one with any considerable quantity of blood; the layer of blood lay on the top of the sediment of pus. On other occasions the proportion of sediment varied greatly; in three samples passed in succession (July 30) the deposit was large in the first, which contained much blood, smaller in the second, and least in the third, which had but little blood. The quantity of albumen likewise varied greatly. The quantity of urine was measured and found to range from 19 to 46 oz. The specific gravity was, as a rule, nearly natural (1010-1020). Under the microscope, pus and blood corpuscles were always discovered, and triple phosphates were obtained in several of the specimens, after standing a few hours. No tube casts were seen. Amorphous urates and crystals of uric acid and of oxalate of lime were seen in some of the samples, and hedge-hog crystals of urate of soda were recorded on two occasions.

Remarks.—The cause of the pyelitis in both cases could only be guessed at, but it was probably due to renal calculus. The absence of any lameness in the second case differentiated the tumour from a peri-nephritic abscess.

HÆMATURIA.

In addition to the cases of Pyelitis (in which this complication existed) other three cases, Nos. 16, 30, 34, may be

classed under this head. Of these, however, only one deserves notice.

No. 30. Samuel M., aet. 42, was admitted on January 28, 1873, suffering from his third attack of hæmaturia. The first attack occurred ten years before, lasting ten weeks; the second occurred about three months later, and continued about the same time. During the nine years, between the second and the third, or present attack, which had lasted six weeks, he is sure there was no recurrence of the bleeding. The bleeding had never any dangerous aspect as regards its amount, and indeed the urine, during his stay, seldom presented much appearance of florid blood. The deposit was rather of a chocolate brown colour, the supernatant fluid being usually more or less smoky in tint. The amount of albumen was generally small, and sometimes inappreciable. The specific gravity varied from 1012-1017, and the reaction was always acid. Under the microscope, blood corpuscles were found associated with tube casts. Some of these contained blood and epithelium, but many were only filled with the colouring matter of the blood.

The general symptoms consisted of occasional rigors, without, however, any severe or paroxysmal pain. There had been no vomiting, and only very slight sickness; pains existed in the region of the 3d and 4th lumbar vertebræ, extending occasionally also to the groin, thigh, and testicle, without any retraction of the last named organ. These pains occurred chiefly, but not exclusively, on the right side. No tumour could be detected on the most careful examination. There was only a slight increase in the frequency of micturition, and there had never been any blocking of the urethra with clots, and there was no reason to suspect vesical calculus. Slight and transitory oedema had appeared in this last attack.

With the exception of induration of the arteries, no lesions could be discovered by physical examination of the organs. The eye was examined by Dr Reid, who found a degree of anæmia of the retina, but no hæmorrhages or other important changes.

The treatment consisted in the administration of Turpentine, and the patient left well on Feby. 25.

Remarks.—The presence of tube casts clearly stamped the hæmorrhage as renal, but the exact nature of its cause could not be ascertained. It seemed, on the whole, more likely to be related to some form of Bright's Disease than to the presence of renal calculus.

BRIGHT'S DISEASE.

The Quantity and Specific Gravity of the Urine in Bright's Disease require to be studied together, and also along with the various incidents of the illness. This renders the statement of any general facts on this subject very difficult; but the careful consideration of the quantity and specific gravity of the urine often lie at the root of the diagnosis of the special form of the renal lesion, and they no less vitally regulate the prognosis and treatment. The quantity of urine is not always easily ascertained, even in hospital practice. When the patients are moderately well, they are apt to neglect the preservation of all the secretion; when they are very ill, there is often the difficulty of keeping the urine separate from the fæces. Considerable attention was paid to the quantity of the urine in the cases of Bright's Disease now under review. The smallest quantity noted in the figures before us is 8 oz. for the 24 hours, just before the death of a patient with chronic renal disease (No. 6.) In another patient, the daily average was 15 oz., falling to 10 oz. shortly before death (No 10.) The maximum recorded is 112 oz. in a case of lardaceous or waxy disease. The average of 6 days giving, in this patient, 97 oz. (No. 5.) Other patients (Nos. 4 and 39) also passed large quantities of urine; but, as a rule, the quantity passed by the patients with Bright's Disease was small (*e.g.* No. 22, under 20 oz.)

The specific gravity of the urine attained a minimum in the case of Hydro-nephrosis already detailed; but in the cases of Bright's Disease proper, it varied from 1005 (Lardaceous Disease, No. 4) to 1045. (No. 10.) The samples tested were those usually passed in the early morning.

The case with this high specific gravity of the urine was one of great interest, as showing this increase in density to be due to albumen.

Urine with high specific gravity from albumen. No. 10. Mrs F., æt. 20, was admitted to the ward on 18th Jany., 1873. She had been confined at the full term 10 weeks before admission. Her delivery was followed by mammary abscesses ushered in by shiverings. These were repeated frequently during the fortnight after her delivery. The last shivering was the most severe, and in a week after it a pain in the abdomen was felt, which, in a few days, was found to be related to an abdominal swelling. This, on admission, proved to be a pelvic abscess. The left thigh was much flexed, and could not be straightened. An examination of the urine was made with the view of discovering if pus were making its way into the urinary passages. No pus and no albumen were found. There was, however, a deposit of lithates. The sp. gr. was 1023. On Jany. 20, diarrhoea set in, and the fæces were found coated with pus. This occurrence distracted any special attention from the urine, as it was considered (correctly enough) that the abscess had opened into the bowel. On Feby. 7, however, it was found that the urine had undergone a remarkable change. It had a copious deposit of urates. On heating, this disappeared; but on further application of heat, the urine solidified, so that no fluid urine could be separated from the coagulum. The sp. gr. of this specimen was 1045. In other specimens examined, between Feby. 8 and Feby. 13, the specific gravity varied from the high figure above mentioned to 1041.

By great care and trouble, and operating on large quantities, a small sample of fluid urine artificially devoid of albumen was obtained and subjected to the tests for sugar by Dr Gairdner, but none was detected. A similar result was arrived at by Mr Ferguson at the University Laboratory, who operated on a subsequent specimen with a specific gravity of 1035. He found, moreover, that on separating the albumen by heat, the residual fluid had only a

specific gravity of 1008, showing thus that the great increase in the density was due to the enormous quantity of albumen present in the urine. The specific gravity was 1036 on the day before death, the quantity of urine having averaged about 15 oz. daily, but latterly only 10 oz. Under the microscope abundant hyaline casts were found, as also pus corpuscles and some epithelium; but there was no evidence of any abundant desquamation of renal epithelium. The patient did not, up till Feby. 12, present any trace of dropsy. She died on the 17th.

The *sectio* revealed an extensive abscess in the left iliac fossa, which had been leaking into the rectum at a point about six inches above the anus, but apparently only to a slight extent. The abscess extended also down into the thigh for 3 or 4 inches below Poupart's ligament. The bladder was intact. The ovary on the left side was enlarged, but did not contain pus: the right ovary, however, contained an abscess as large as a hazel nut. The kidneys were much enlarged, and weighed together 23 oz. The cortical substance was very pale, with a certain amount of opacity.

This case, however, is extremely exceptional, and it is a safe rule to regard the specific gravity as an index of the quantity of the urea and salts contained in the urine. Thus within a short time after this case occurred, a urine was sent to me, which appeared, from its aspect on heating, to be nearly as albuminous as the one described above; but it was found to lose on the separation of its albumen only a small fraction of its specific gravity, which remained indeed rather above the normal.

It is necessary, as already stated, to consider the specific gravity in its relation to the quantity of urine passed. Thus in Case No. 5 (Lardaceous Disease) the average quantity was very high, being about 90 oz. in the 24 hours, but the mean of the specific gravities recorded was only 1009.7. On the other hand, in Case 22 the specific gravity was always high, at least 1025 or upwards, but the quantity was small, say 20 oz. or under. An increase in the quantity may be at the expense of the specific gravity, or *vice versa*; a more

satisfactory indication of improvement is an increase in both, such as will be referred to in describing Case 26. The quantity of urine in chronic Bright's Disease, however, may be considerable without any very extreme depression of the specific gravity. Of this we had an illustration in Case 39, where the urine seemed always to have been copious, and on measurement it yielded an average of $4\frac{1}{2}$ pints (90 oz.); the mean result of the observations on the specific gravity gave 1012.1. Even more remarkable was the case of a man (No. 27) where the smallest quantity noted was 48 oz., and the average ranged between 60 and 70 oz.; the specific gravity averaged as high as 1015, and yet this apparently ample flow of urine with a seemingly average specific gravity did not save the patient from an attack of uræmic coma. But the study of the quantity of urine must likewise embrace a consideration of other and, as it were, accidental circumstances. The action of remedies must be taken into account, and the influence of diarrhœa, whether spontaneous or produced by purgatives, must also be kept in view. Such an influence was well illustrated in Case 25. The average daily quantity of urine under a course of treatment by cream of tartar amounted to 61 oz. Subsequently diarrhœa supervened, and the quantity was satisfactorily ascertained to diminish to 51, 40, 30, and 27 oz., and at the same time the specific gravity rose progressively from 1016 to 1026.

Tests for albumen.—The two tests relied on were heat and nitric acid in the cold. Certain fallacies as is well known beset both methods, and some of the less experienced clinical clerks at times fell into the error of mistaking for albumen the earthy phosphates occasionally precipitated by heat, or the cloud of urates sometimes precipitated by nitric acid in the cold. It is usually considered and sometimes stated that "as both the heat and the nitric acid test may lead to wrong conclusions if trusted to exclusively, but as they are so manifestly complementary to each other, we must, to obviate all sources of error in every case employ both" (Da Costa, *Medical Diagnosis*, 3rd edition, p. 623). But a recent specimen of urine from a private patient with *icterus* de-

monstrated the fallacy of trusting, in a loose way, to the *complementary* character of the tests. The urine referred to was shown to the clinical class by Dr Gairdner as an example of the combination of both fallacies; the earthy phosphates were precipitated by heating, and the same urine gave a dense precipitate of urates on the addition of nitric acid in the cold. These results were so staggering, at first sight, that it was only on careful and repeated examination that the absence of albumen could be confidently announced, more especially as microscopic examination revealed an abundant deposit of tube casts. The precipitate on heating, was readily soluble in dilute acids. The precipitate on the addition of nitric acid disappeared on the slightest heating. A similar precipitate, moreover, was formed on the addition of acetic acid to the cold urine, and this precipitate was also soluble on heating; precipitates by both of the acids were soluble in excess of the acids used. To put the matter, however, beyond doubt, samples were handed to Dr Moffat for examination at his laboratory, and to Mr Ferguson at the University laboratory. The former determined the acidity of the sample he examined to be equal to 3.03 grains of caustic soda per 1000. He also subjected the precipitate by acetic acid in the cold urine to a careful examination after filtration, and found it to consist of urate of ammonia highly charged with biliary matter. Mr Ferguson kindly examined the precipitate thrown down on heating the specimen, and by the proper processes determined its composition as phosphate of lime. Careful chemical examination therefore fully corroborated the inferences as to the nature of the two precipitates drawn from our clinical experience of the usual reactions.

It is not often that any serious difficulty arises from the sources of fallacy just referred to in the hands of any one of experience. Errors, however, were not unfrequently made even by the most experienced in the wards, but these were usually in the direction of declaring a urine non-albuminous in cases where distinct traces could really be found. These errors arose in some instances from not waiting long enough

for the nitric acid to produce a cloudiness by its action on the albumen ; when the quantity is small some minutes may elapse before the opacity becomes obvious. The opacity on heating was often demonstrated by acting on the upper part of the tube, and leaving the lower as a basis for comparison ; and this sometimes succeeded in cases where a distinctly negative opinion had been previously announced by very competent parties. These errors are dwelt upon inasmuch as the first examination of a urine for albumen, if the result be negative, is very apt to prevent any subsequent watch being kept on this secretion till some circumstances seem to demand a renewed examination, such, for example, as the discovery of tube casts, as sometimes happened in the wards.

TUBE CASTS IN NON-ALBUMINOUS URINE.

Although tube casts are well enough known to occur occasionally in non-albuminous urines, they are but seldom met with under such circumstances in our hospitals here. One of the cases No. 29, presented this point of interest. John R., aet. 58, was admitted on January 30, 1873, complaining chiefly of pulmonary symptoms. The urine for the first two days after admission was found to be albuminous, and to have a copious white sediment of urates. On examination by the microscope, tube casts were readily discovered ; but on the clinical clerk (who was not aware of this urinary examination) bringing up his report in a few days, he reported the case as purely pulmonary, and stated the urine to be without albumen. On investigation this was found to be strictly true ; no reactions could be obtained by the most careful application of the tests by heat or by nitric acid in the cold urine. Careful search in the deposit, however, revealed the presence of tube casts, and during the patient's stay in the ward (up till March 19) although albumen could not be detected, hyaline and granular casts (sometimes with distinct fatty specks) were found on nearly every occasion on which they were diligently searched for. The urine often contained an abundant deposit of oxalates. The

specific gravity varied from 1015 to 1028, but was usually about 1025. The reaction was always acid, and the quantity was probably about normal or somewhat more than usual. The patient, in addition to his pulmonary troubles, was found to complain of pain in the neighbourhood of the left kidney, and some tenderness existed in this situation. Dr Gairdner was convinced of the presence of some abnormality in this region, there being a sense of fulness, with localised weight and yet mobility, such as might be caused by the presence of a somewhat large calculus in the pelvis of the kidney. There were but few other indications corroborative of this idea, although the frequency of micturition was no doubt too great. No further light could be obtained on this point, so that although the condition continued very much the same in the lumbar region, the diagnosis remained doubtful. It is possible the disorder of the kidney was of a local nature (as from renal calculus), but it is also possible that the tube casts revealed an incipient stage of Bright's Disease, such as is described to occur occasionally in the contracted kidney, without albuminuria.

Since this case directed my attention to the occurrence of tube casts without albuminuria, careful search has been made in various deposits submitted to examination, and the presence of abundant tube casts in the urine of the patient with *icterus* already referred to, was the most striking illustration of their presence apart from albumen. Professor Nothnagel in the October number of the *Deutsches Archiv für klinische Medizin*, 1873, reports very fully on this subject (*Harncylinder beim Icterus*.) He seems to have found a greater or less number of tube casts in the urine in nearly every case of deep jaundice which he examined, and in two-thirds of such cases albumen was absent. The presence of the tube casts would seem to be related to the biliary matter excreted by the kidney.

Dr Beale (*Kidney Diseases*; 3rd edition, p. 342) has directed attention to the presence of what he calls "mucus casts" occurring in non-albuminous urine, due apparently to renal irritation, and occurring in cases where a suspicion of renal calculus

is raised by the symptoms. The urine in such cases is said to be loaded with urates. A case answering exactly to this description came under my notice a few months ago. The urine was loaded with urates and octohedral oxalates, and little clusters of dumb bells were found under the microscope. Numerous casts were also found, some resembling exactly the ordinary tube casts of renal disease, but most of them differing from such in being larger and in several cases dividing into branches. The tests for albumen gave a negative result. Fresh samples were procured in a day or two. The tube casts had disappeared, but so also had the urates and oxalates. This patient had had on one occasion about this time severe pain in the loins for half-an-hour. Yet other cases of tube casts, apart from albuminuria, have of late come under my notice, and some extended inquiry into the alleged occurrence of tube casts in healthy urine would be required, before the detection of an occasional cast or even of a few casts should be allowed to sway our diagnosis and prognosis in cases where the absence of albumen, and also of any direct renal symptoms, seems to leave the kidney out of the question.

Before quitting this subject it may be mentioned incidentally that tube casts were frequently discovered in urines which showed little or no apparent sediment, and also where the traces of albumen were extremely faint. Indeed, as already mentioned, the detection of tube casts sometimes led to the re-examination of a urine which had been pronounced free from albumen with the effect of establishing its presence.

COMPLICATIONS OF RESPIRATORY AND CIRCULATORY ORGANS IN ALBUMINURIA.

Such complications occur so often, and are so intimately mixed up with renal affections that, in a given case, it is often difficult or impossible to discover which are the primary and which the secondary phenomena. Affections of the heart and lungs, there can be no doubt, sometimes cause and sometimes are caused by renal disorder. In the case of Embolism of the Kidney (No. 19) already

detailed, we have a clear case of *secondary* renal mischief, and, no doubt, such lesions are commoner than we usually suppose at the bed-side. Thus, Case 14 was regarded during life as presenting an ordinary congestive affection of the kidney consequent on emphysematous bronchitis. The physical signs were those of emphysema, with hypertrophy and dilatation of the right ventricle; excessive lividity, respiratory distress, and dropsy constituted the chief symptoms in the case. The essential accuracy of this view was demonstrated at the *post mortem*, but the renal lesion was found to be embolic. The kidneys were of normal dimensions, but they contained several embolic *infarctus* of small size. Some of these were recent, but most of them had advanced to a state of fatty degeneration or even to approaching cicatrisation. No valvular lesion was discovered, and no vegetations were found on the left side of the heart. In the right *appendix auriculæ*, however, some globular vegetations existed, and embolic lesions were found in the spleen. The urine in this case was only slightly albuminous, and on several occasions it was recorded as free from albumen. The specific gravity ranged from 1020 to 1025—the quantity being usually scanty. Urates always existed as a sediment, and hyaline or granular casts were several times found on examination. *It must specially be noted that pus corpuscles were usually entered in the record of the urinary examinations.*

On April 2d, two *post mortem* examinations were made on patients with albuminuria, and they well illustrated two forms of renal disorder due to cardiac disease. No. 38. A young man, 18 years old, had suffered from rheumatic fever eight years before, and had been affected with cardiac and pulmonary symptoms since then. Dropsy had existed for three weeks, and it affected the upper part of the trunk to such an extent as to obscure greatly the physical examination. The urine was albuminous, but *no tube casts* were found in the sediment. The *sectio* revealed adherent pericardium and other cardiac disorders, and the kidneys were found to be very firm in their texture; but, although slightly hyperæmic, there was

no distinct organic lesion. This afforded a good illustration of *induration from congestion*; but the next case (No. 17), that of a woman aged 40, showed the usual appearances of incipient inflammatory changes. The kidneys were somewhat enlarged and weighed together 12 oz. In her case also there was a rheumatic history followed by cardiac and pulmonary distress (the aortic and mitral valves were both affected), and oedema of the limbs had also come on. In this case there was blood as well as albumen in the urine, and the urinary sediment was loaded with epithelial casts.

Somewhat more difficult to decide upon was the case of Sarah D. (No. 8), although here, too, the cardiac mischief was probably the initial lesion, leading to pulmonary and renal changes of permanent and serious import. The patient, however, only dated her dyspnoea as of six weeks' standing, and the dropsy as of three months' duration. Physical examination revealed such an extent of precordial dulness as even to raise the question of hydro-pericardium, and two murmurs following the first and second sound respectively were plainly audible. Dulness on percussion was detected from the right scapular spine downwards, and in this situation (especially at the level of 8th dorsal spine), a coarse superficial crepitus was heard, without, however, any marked increase of the vocal resonance, and without there being any bulging of the intercostal spaces. The patient complained much of breathlessness and of cough; but there was little or no expectoration. She also complained of pain in the hypogastrium (the significance of which only appeared at the *post mortem*, when a small pelvic abscess was discovered). In view of the facts ascertained Dr Gairdner formulated the diagnosis, "*Hypertrophia cordis cum dilatatione (Qu. hydro-pericardium?) Infarctus pulmonis dextri; non-hæmoptoicus: Regurgitatio mitralis et aortalis: Polyuria, dein oliguria: Anasarca: Orthopnoea.*"

This proved an exceedingly accurate statement of the case. The heart was found so large as to weigh 22 oz. The aortic valves were found insufficient; the mitral orifice

was so much dilated as to admit four fingers, and the general thickening of the endocardium of the left ventricle extended to the *columnæ carneæ*. The right lung was found to contain four or five hæmorrhagic *infarctus*—one especially large at the lower and anterior part. They presented the usual characters of hæmorrhagic condensations. The kidneys weighed $7\frac{3}{4}$ and 8 oz., left and right respectively. They both presented a minutely granular appearance on the surface. The capsule was unduly adherent, and the cortical substance on section was pale and somewhat irregular. In the left kidney one of the pyramids was much contracted, as also the cortical substance on its surface, so that the base of the pyramid was close to the surface of the kidney.

The quantity of the urine in this case underwent a distinct increase under treatment, rising from 8 oz. to 32 oz.,—the average of several days rising from 14 to 27 oz. in the 24 hours. The specific gravity was always high (1028—1035), and there was always a deposit of urates. After admission, albumen was found in considerable quantity, but towards the end of the case only slight traces could be detected, and on one or two examinations, none was found. Granular tube casts were seen on several occasions.

As a contrast to the foregoing, the following case may be cited to show the influence of old renal disease on the heart and lungs. Case No. 6. This woman, who was 42 years old, had a slight degree of emphysema, probably of old standing. The heart's pulsation was somewhat diffuse and extended into the epigastrium, and at the *sectio* it was found slightly hypertrophied. The dropsy of which she complained was of some three months' duration, but in the progress of the case after admission, the signs of pulmonary and laryngeal œdema were developed to a high degree; lividity became extreme, and she died after five days' stay in the ward. Only 8 oz. of urine were passed during the last 24 hours of her life. The specific gravity was low, 1010—1012, and in the very slight sediment which settled down hyaline and granular casts were easily found. The amount of albumen was large. At the *inspection*, œdema of the lungs, thickening of the

bronchial mucous membrane, and emphysema of the pulmonary margins were noted, as also some degree of cardiac hypertrophy. The kidneys weighed—the right 5 oz., and the left $6\frac{1}{2}$ oz. The capsules were adherent and the surface pale, but with congested blotches. There were also a considerable number of depressions, some of them pretty deep, but without producing any general granular appearance. On section, the cortical substance was found paler than the pyramidal, and especially in the right kidney it was much reduced in thickness, so as to amount to only a couple of lines.

BRIGHT'S DISEASE: COMPLICATION WITH AGUE FITS.

No. 26, Daniel B., a sailor, aet. 32, was admitted on Nov. 9, 1872. He complained chiefly of dropsy and of breathlessness, but it transpired that since July he had been subject to shiverings occurring at first every three or four days, but latterly at more frequent and uncertain intervals. These shiverings were witnessed the day after admission, and inquiry led to the conviction of their being essentially similar to the rigors he had had, when suffering from "Malta fever," four months before. They were apt to be induced by any exposure to the cold air, and, although as a rule, the patient was not feverish, the thermometer showed a high degree of pyrexia during and immediately after the rigor ($104^{\circ}.6$ in rectum). The dropsy and renal disorder had in all probability supervened upon this ague, but the history of its origin could not be traced with perfect accuracy. In addition to the anasarca and ascites, there was considerable congestion or oedema of the lungs, which sometimes assumed a threatening aspect. The heart seemed normal. The liver was certainly not enlarged, and the spleen could not be felt under the ribs. Ophthalmoscopic examination, on December 1, revealed optic neuritis on both sides, with oedema of the connective tissue of the entrance of the nerve, and of the retina. There were no extravasations, but the fundus was of a deeper tinge than natural, and the vessels were partially obscured. The urine was scanty on admission (say about 16

oz.), with a rather high specific gravity. It was very albuminous and presented usually a deposit of lithates, and the sediment contained hyaline, epithelial, and granular tube casts. The chlorides varied very considerably. On admission they were almost absent from the urine, and even on November 14 they were recorded as scanty, but after this they seemed to be present in nearly normal quantity. As Dr Gairdner considered the shiverings to be due to the presence of an intermittent fever, quinine in ten grain doses was given in brandy (or otherwise) on November 12, and for a few days afterwards, and no rigors occurred after the 17th November. Cream of tartar, acetate of ammonia, and gin were likewise employed, and a distinct improvement became observable especially after the beginning of December, both as to the quantity of urine passed, and as to the dropsy and dyspnoea. The following notes show the gradual and satisfactory improvement in respect of the urine—the increase of the quantity not being at the expense of the specific gravity, and the amount of albumen coming down at the same time.

Nov. 13—20—	Mean quant.	16 oz. in 24 hours—	Specif. Grav.	1022 to 1029.
" 23—27	"	25 oz.	"	"
" 28 Dec. 2	"	34 oz.	"	"
				} 1030 to 1033.

After November 27, albumen was either absent or existed only in minute quantity, and subsequently it could never be detected. The treatment latterly was by tinctura ferri, and the patient, having made a complete recovery, left the hospital on December 19.

NERVOUS COMPLICATIONS.

Of these the most interesting were afforded by two men who were admitted on May 12, who both presented many of the typical symptoms of locomotor ataxia. In both, there was great deficiency of the balancing power, and this deficiency became much more marked on their eyes being closed; in both there was also a deficiency of the cutaneous sensibility in the lower limbs. In both patients there was, or had been, some oedema of the legs, and in both cases the urine was albuminous.

Thos. S. (No. 40), aet. 36, had served as a soldier for eight years in India, where he received a bayonet wound at the lower part of the sternum, and he said he was discharged in 1861 for refusing to allow the surgeons to extract a piece of dead bone. (There was a deep scar but no open sore, and no bone seemed to have come away.) Three years before admission he had suffered from rheumatic pains in the back, hips, and lumbar regions. Nervous symptoms had existed for about three months, beginning with a sense of prickling, coldness, and numbness in the lower limbs; for six weeks the motor functions had been impaired. He had still worked as an engine-keeper up till admission, but for three weeks he had been unable from unsteadiness to climb the ladder, as before, for the oiling of his machine. There was no ocular affection. Very slight oedema existed on admission, but it disappeared with a day's rest. The urine was loaded with albumen ($\frac{1}{2}$ to $\frac{3}{4}$ settling in the tube), the specific gravity was 1010-1012, the deposit to the naked eye sometimes appeared to be purulent, and on microscopic examination pus corpuscles were always found, but no casts were seen. After admission the bowels were found to be rather loose, but owing to the state of the urine no attempt was made to stop the diarrhoea. It appeared, however, that it had ceased spontaneously on the 27th, on the forenoon of which day he felt as well as usual, but in the evening severe convulsions came on. He had upwards of 12 convulsion fits; consciousness returned in the intervals of the earlier ones, but latterly coma supervened. Treatment by purgation failed to save the patient. Two or three ounces of urine were drawn off by catheter, and this was as highly albuminous as before. The breath gave an alkaline reaction, and he died on May 29, but unfortunately an inspection of the body could not be obtained.

The other patient (No. 41), Archd. B., a tall thin man, was 55 years old. He, too, had been in the army and was dismissed for varicose veins in 1849. He had suffered occasionally from oedema of the limbs, and complained of frequent and difficult micturition—due in part perhaps to a stricture. The

ataxic symptoms were of eight months' duration, but had been worse during the last four weeks. In addition to the motor and anæsthetic affections already referred to, he had a squint of the left eye, the pupil of which was smaller than the right, but he had never been troubled by double vision. He had suffered from syphilis, and his liver seemed considerably enlarged. The urine was but slightly albuminous, and the specific gravity ranged from 1013-1019. No casts were found. He only remained in hospital a short time, and was dismissed somewhat improved on May 29.

The association of paraplegia with albuminuria was observed in Case 20.

Coma supervened in the case of Hugh M'G. (No. 27.) This man, who was 47 years old, had suffered a severe compound fracture three years before. His liver seemed large, although, perhaps, this was not quite certain, and he passed rather a large quantity of urine, the smallest amount noted being 48 oz. There was thus some reason to suspect the renal disorder to be of the waxy character, but this was by no means certain, and was contra-indicated by some other phenomena. The heart was hypertrophied, and there was some irregularity in its action. Arterial degeneration and *arcus senilis* likewise existed, and he complained of a singing in his ears. He was admitted on November 19, and under diuretic treatment (cream of tartar), the urine for five days *before* the attack of coma averaged 60 oz., with an average specific gravity of 1014·7. Coma occurred suddenly on November 26, and lasted for half-an-hour. It was preceded by some dimness of vision, and vomiting occurred immediately before the fit. The urine during the five days *after* the comatose attack averaged 69 oz., with an average specific gravity of 1015·1. The quantity of albumen was usually considerable, especially before the attack, and the microscope revealed hyaline, granular and fatty casts, with fatty epithelium, granular masses, and occasionally blood corpuscles. The patient still complained of misty vision several days after the comatose attack. The retina was examined on

December 1, by Dr Reid, who found the optic nerve entrance on both sides to be pinkish, with dilated or tortuous veins, and one spot of extravasation was found near the point of exit of the retinal vein towards the lower and outer side of the right disc. The patient was dismissed improved on December 19.

A combination of partial coma, with delirium, was observed in case No. 23. This patient was 50 years old, and of intemperate habits. The dropsy had invaded the peritoneum, and the affection had lasted altogether for about two years. The urine was loaded with albumen ($\frac{3}{4}$), and hyaline and granular casts were found in the sediment. The liver seemed rather small. The delirious condition was associated with some degree of coma, but the pupils were dilated rather than contracted. This condition appeared on Oct. 25, 26—four or five days after admission—and the patient could not be brought to acknowledge anything unusual in his conduct and state at this time. Notwithstanding the alarming symptoms and the generally unfavourable aspect of the case, the patient improved very considerably under diuretic remedies (cream of tartar, squill and digitalis), and he went out on November 2.

Case No. 43 presented a most interesting and puzzling combination of pulmonary and renal symptoms and signs, which led to a great difficulty in determining whether the nervous symptoms which supervened were due to uræmia, or to an extension of the tubercular affection (from which he, no doubt, suffered) to the brain or its membranes. The nervous state was that of lethargy, varying in depth and bordering on or even merging at times into coma. There was no local paralysis, and the pupils, although sluggish, were neither contracted nor dilated. The urine was albuminous and contained hyaline tube casts; but, as a blister had been applied the first night he was admitted, the exact significance of this could not be determined, especially as the albumen became much more abundant after a second vesication. The study of the case was rendered comparatively useless by the refusal of an examination after death.

AFFECTIONS OF RETINA.

The only very marked case of this complication was that of Archibald S. (No. 24). This man was a policeman, 32 years of age. He was admitted on Nov. 5, and was only in the ward six days. His illness began, as he supposed, about a year before, with what was called inflammation of the left kidney, and since then he had been subject to occasional oedema. He seemed to have suffered from palpitation of the heart for about two years. Within two months before admission, the symptoms had been aggravated by the occurrence of pain in the head, marked failure of the vision, occasional vomiting, and cough with hæmoptysis—the last of only a few days' duration. The heart was found much hypertrophied (apparently in both ventricles), and a soft-blowing murmur (pulmonic?) was heard to follow the first sound. The second sound was much deepened in tone, especially over the pulmonary valves. The arteries were found somewhat rigid. A degree of dull percussion was likewise detected at the base of the left lung. The urine was very pale, with a specific gravity of 1009 and 1011. It contained a large quantity of albumen; but the microscopic examination was not recorded. The ophthalmoscopic examination by Dr Reid revealed opaque patches, isolated and well defined, chiefly around the macula lutea, and hæmorrhagic spots were also seen. There was neuritis of the optic nerve on the right side.

A series of ophthalmoscopic examinations, kindly undertaken by Dr Reid, on Dec. 1, embraced several patients with Bright's Disease, then in the wards, irrespective of any complaint of defective vision. The notes are here recorded:—

M.G. (No. 27). (Five days after the attack of coma, already described.) Optic nerve entrance on both sides, pinkish, with dilated or tortuous veins; one spot of extravasation near the point of entrance of the retinal vein, at lower and outer side of the right disc. (*See page 68.*)

B. (No. 26).—Neuro-retinitis of both eyes, with cedema of the optic nerve and of the retina; no extravasation, but

fundus of a deeper tinge than usual, and the vessels partially obscured. (*See page 65.*)

M.G. (No. 22).—Hypermetropia and consequent changes.

K. (No. 5).—(Waxy disease of kidneys, &c.;) optic neuritis with tendency to extravasation in right disc. (*See page 72.*)

M. or B. (No. 4).—Congestion of the vessels; choroid thinned; white glistening bodies in right (corpora amylacea?) (*See page 73.*)

K. (No. 3).—Myopia, staphyloma posticum; traces of extravasation in right.

The investigation of the state of the eye is, no doubt, very important in Bright's Disease; but hitherto the appearances, described as observed, have been too much those which occur in cases with some marked defect of the vision. Examinations by experienced observers (able to allow for the manifold alterations induced by optical and other defects) would require to be made in a number of cases of Bright's Disease, selected apart from visual symptoms, before we can properly judge of the diagnostic and prognostic value of ophthalmoscopic appearances. The marked optic neuritis, with oedema, in the case No. 26, seemed, under the perilous circumstances of this patient's case, to portend nervous disasters, but he recovered from his illness without any such calamities overtaking him.

LARDACEOUS, OR WAXY DISEASE.

Two female patients, Nos. 4 and 5, were admitted about the same time, and lay in adjoining beds, presenting the typical appearances of this disorder. They served well to demonstrate to the clinical class the points by which the diagnosis could be made. They both presented an extreme and very striking degree of pallor. They were both the subjects of chronic lung disease, the signs of which, although not very glaring, became ultimately sufficiently plain, and in both this pulmonary affection seemed to be the predisposing cause. In neither of the cases, however, was there any profuse expectoration, and in one of them (No. 5) the whole

chest complaint scarcely obtruded itself on the attention. Both patients likewise had prominent and much enlarged livers, and they both passed a large quantity of albuminous urine, of low specific gravity, the sediment of which contained a few hyaline or granular casts. They both ultimately suffered from diarrhoea before their death, and in both the dropsy was comparatively inconsiderable.

No. 5, Margaret K., aet. 23, was admitted on November 19, 1872. She had a child three years before admission, but although her health was never quite satisfactory, after that, she reckoned her illness as only of eight months' duration; during this time the menses had been suppressed. Her chief complaint was of weakness, of pain and uneasiness in the epigastrium, and of looseness of the bowels. She had only a slight cough, and but little expectoration, so that she regarded her chest symptoms as of no consequence. Careful examination of the apices of the lung led to a suspicion of mischief in the left, and ultimately a diagnosis of cavity was arrived at. The pain in the epigastrium was closely related to the taking of food, and led to a suspicion of gastric ulcer, which, however, was not found at the *sectio*. The diarrhoea was persistent, and *quasi* dysenteric in character. The liver was large, and the dulness measured eight inches vertically in the lateral region; there seemed to be a little tenderness over this organ in the epigastrium. The spleen could not be declared enlarged. The thermometer during the first fortnight after admission showed a mean of 99°. 4 F. for the morning temperature, and 100°. 1 F. for the evening. The urine measured from Nov. 23 to Nov. 26 showed a mean of 84 oz., and during the next four days of 97 oz. in the twenty-four hours. The specific gravity ranged from 1006 to 1015, and the mean of fifteen observations was 1009·7. It was always albuminous, but usually only to a slight degree, and tube casts, hyaline and granular, were found under the microscope. Oedema of the limbs was said to have been noticed only three weeks before admission, and it never was severe or troublesome. The diarrhoea moderated in its severity after admission, but

the patient sank exhausted, and died on January 10, 1873.

The *post-mortem* examination revealed the existence of pneumo-thorax on the left side, a large cavity on the posterior aspect of the lung having opened into the pleura. A few adhesions existed at the apex only; there was no recent lymph. The right lung was also condensed and excavated in several parts. The liver was large, firm, and resistant, with the grey transparent hue of the amyloid liver, but also with the opaque yellow of fatty infiltration; it weighed 7½ pounds. The spleen was slightly enlarged, the malpighian bodies were amyloid, but not to a very advanced degree. Both kidneys also presented a limited degree of amyloid degeneration; the cortical substance was pale. There were very numerous ulcerations in the intestines, beginning at the lower third of the jejunum, and affecting also the cæcum. The mesenteric glands were enlarged, and some of them cheesy.

No. 4., Catherine B. or M., aet. 30, was admitted on November 4, 1872. After her last confinement, two and a half years prior to admission, she had slight hæmoptysis, and since then she had suffered from cough. Physical examination of the chest revealed distinct evidence of consolidation of the apex of the lung, but no very glaring auscultatory signs were found. The liver was enlarged, and measured about six inches in the line of the nipple. The splenic dulness seemed also large, but this was more doubtful. The temperature on December 22 was noted as giving a mean of 99° F. for the morning, and 101° 3 F. for the evening observations. The bowels had sometimes been loose, but they were usually confined. The urine on measurement varied from 37 to 80 oz. It always contained more or less albumen, and hyaline tube casts were found in the sediment. The colour was usually pale, and the specific gravity varied from 1011 to 1015.

This patient improved under treatment by quinine and other remedies, and was able to go home on December 3, to resume her work in the mill. She continued at work for

about three months, but sought admission again on June 11, 1873. The pulmonary symptoms and signs were worse, but the expectoration, although globular in character, was still but slight in quantity. The liver had become larger, and measured eight inches vertically; the spleen also was now distinctly enlarged. The febrile movement was still slight, and would have been unnoticed, but for the thermometer. (June 21, mean 4 days, morning, 100°. 1, evening 100°. 9.) (Edema had increased, but still was not excessive. Diarrhoea had existed for four weeks before her re-admission. The urine had fallen greatly in specific gravity, so that the mean of nineteen observations amounted to 1008½. The quantity of albumen was usually only slight, and hyaline casts and pus (sometimes to a considerable amount) existed in the sediment. She died on July 20, but no inspection was obtained.

TREATMENT OF RENAL DROPSY.

The standard treatment adopted by Dr Gairdner in all cases with diminished secretion of urine was by diuretic remedies, assisted at times by an occasional purge, and sometimes by the warm pack or other diaphoretic agencies. Of diuretics cream of tartar in electuary constituted the chief agent; but infusion of digitalis, squill, spirits of nitrous ether, and juniper were also frequently employed. The action of cream of tartar in promoting diuresis and in relieving the dropsy was very carefully and critically noted, especially in Case 3. In this case, the influence of the medicine became established on Nov. 12, before which time it had not been taken, owing to sickness. The figures gave averages as under:—

5 days before the 12th Nov.,	- -	24 oz. in 24 hours.
7 " after the 12th Nov.,	- -	70 oz. do.
7 " from 19th to 25th Nov.,	- -	48 oz. do.
8 " from 26th Nov. to Dec. 3d,	- -	51 oz. do.

"It appears, therefore, on the whole, that after the action of the cream of tartar was fairly established, the urine previously deficient in quantity, as compared with the

"normal standard, became decidedly in excess—even, it may be said, more than doubled in quantity; and although the large quantities of the first few reports have not been maintained, the quantity has never again fallen within the normal standard, but has kept slightly though appreciably above it. The swelling has almost or entirely disappeared, but she says it returns at times when she sits up. The changes in other respects, as regards the urine, have not been striking. The specific gravity all through has varied from 1013 to 1020—1015 or 1016 being most usual. The quantity of albumen has also varied, but not in any definite relation to the quantity of the urine." (Extract from *Ward Journal*, Dec. 3, 1872.)

The only novelty in treatment attempted was the trial of the skim milk diet as a remedy. This was put to pretty frequent trial by Dr Gairdner at a period somewhat earlier than that embraced in the report now made; but the results on the whole were not satisfactory (either to the patient or to the physician), so that, notwithstanding an occasional appearance of benefit, this method of treatment was practically abandoned. Amongst the cases here recorded, two of the earlier ones were subjected to the trial. Of these one was a case of old standing dropsy with granular and fatty tube casts in the urine. The man had been intemperate, and cirrhosis of the liver was also suspected. The other case was one of recent albuminuria without marked dropsy, and with unilateral pain, such as to suggest the possibility of a unilateral affection. The two cases may be taken as representing two very opposite forms of Bright's Disease; but in neither case was the result of the skim milk diet encouraging.

Andw. M'G. (Case 22) was placed on an exclusive diet of skim milk on October 31. The following note was made by Dr Gairdner on November 5:—"It seems quite clear that in this case the milk treatment has not agreed well, patient having used it to the extent of 60 to 70 oz. *per diem*, without positive good result as regards the urine, while on the other hand, patient has been aware of pretty con-

“stant indigestion from it—the milk coming back with
“bitter taste in the mouth, and a certain amount of nausea.
“Owing to the somewhat irritable state of bowels there
“never has been any trustworthy collection of the whole
“urine, and it is impossible to say precisely whether the
“milk has increased or diminished the quantity. Patient’s
“own impression is that it is less, and this, so far as the
“noted results are worth anything at all, is corroborated by
“the quantities noted by nurse; but it seems quite certain
“that a good deal has gone in the stool.” The treatment
was therefore changed, and ordinary food allowed, with
apparently relative advantage to the patient.

The other patient referred to, Jessie M'L. (No. 2), had
been seized with pain in the left side on October 21, and
her urine was then of a dark colour. She was admitted
on 28th October. Only very slight puffiness of the face
could be detected. There was no general dropsy. The
urine was albuminous (sp. gr. 1016), and hyaline and
epithelial casts were found in the sediment. On October 31
she was placed on skim milk diet exclusively. On November
9, Dr Gairdner recorded the following:—“Under about eight
“pints of skim milk daily, the quantity of urine has, on the
“whole, increased; but not so greatly as might be expected,
“as it has never been recorded above 52 oz., while the
“quantity drunk must have been not less than 160 oz. The
“amount of albumen in the urine has diminished very con-
“siderably, but was never absent, nor have the characters
“of the urine in other respects much changed. Patient
“expresses some dissatisfaction with the milk diet, which
“has produced some degree of nausea.” She was there-
fore allowed to return to ordinary diet, under which the
amount of urine continued to keep nearly as high as
before (43-46 oz.), and she was dismissed well on November
26, 1872.

LIST OF RENAL CASES—SESSION 1872-73.

(In a few cases besides the following, albuminuria was recorded as a transient or slight phenomenon, e.g., in Pericarditis, Rheumatic Fever, Aneurism, Typhoid Fever, Pneumonia, and Tuberculosis).

1. (*Renal Dropsy*.) Eliza J., aet. 60, admitted October 28, 1872. Œdema, 14 days. Pain in back. Urine somewhat scanty; sp. gr., 1015-1020; albuminous and with hyaline casts. Treatment by iron: dismissed much improved, November 21, 1872—Re-admitted, January 22, 1873, with signs of pulmonary phthisis. Little or no œdema now. urine slightly albuminous: sp. gr., 1016-1019. Dismissed improved, February 12, 1873.
2. (*Albuminuria*.) Jessie M'L., aet. 20, admitted October 28, 1872. Urine dark in colour on October 20; pain in left loin on 21st; sickness and feverishness; œdema of face and ankles barely appreciable; urine albuminous, 1012-1018; epithelial tube casts. Treatment by cream of tartar, and trial of skim milk diet for a few days. Dismissed well, Nov. 26, 1872. (See page 76).
3. (*Renal Dropsy*.) Mrs K., aet. 46, admitted October 29, 1872. Œdema for three weeks, beginning in face; œdema during her four pregnancies, especially in first, in 1862; urine albuminous; sp. gr., 1019-1019; hyaline and granular casts; quantity scanty, average more than doubled under use of cream of tartar. Dismissed very much improved, December 12, 1872. (See page 74).
4. (*Waxy Disease of Kidneys, &c.*) Catherine B. or M., aet. 80 years, admitted November 4, 1872. Cough and hæmoptysis 2½ years before; signs of pulmonary phthisis; liver much enlarged; pallor extreme; urine albuminous, copious; sp. gr., 1011-1015; hyaline tube casts; no dropsy. Treatment by quinine, sulphuric acid. Dismissed improved, December 3, 1872—Re-admitted, June 11, 1873. Pulmonary signs advanced; liver larger; spleen also large; diarrhoea for four weeks only; some œdema of limbs now; urine much diminished in density since previous stay in ward (average 1008½.) Died, July 20, 1873. No. p.m. (See page 73).
5. (*Waxy Disease of Kidneys, &c.*) Margaret K., aet. 23, admitted November 19, 1873. Weakness and pallor; diarrhoea; slight œdema for three weeks; obscure signs of consolidation and cavity of lungs; liver large; urine pale, very copious; sp. gr, 1006-1011; hyaline and granular tube casts. Treatment by quinine and acids, opium, &c. Died, January 10, 1873. *Sectio*—Waxy disease of viscera; ulceration of intestines; cavities in lung, and pneumo-thorax. (See page 72).

6. (*Bright's Disease—Contracted Kidney, Pulmonary Complication.*) Mrs B., aet. 42, admitted Dec. 4, 1872. Œdema of feet for three months; cough, lividity, some signs of emphysema with bronchitis; urine scanty; sp. gr., 1011, albuminous; hyaline and granular tube casts; hoarseness; death on December 9, 1872. *Section*—Contracted kidney; emphysema; œdema of lungs, thickening of bronchial mucous membrane. (See page 64).
7. (*Cardiac, Pulmonary and Renal.*) Susan C., aet. 6½, admitted Dec. 9, 1872. Œdema two months, dyspnoea; loud bronchitic râles; albuminuria. Died next day, December 10. *Section*—Extreme atheroma of arteries; hypertrophy of heart; œdema and hæmorrhagic condensation of lungs; kidneys with numerous cysts, and dark patches—somewhat wedge shaped—seen on section.
8. (*Cardiac, Pulmonary, and Renal.*) Sarah D., aet. 40, admitted January 8, 1873. Œdema two months; dyspnoea, six weeks; increased precordial dulness, double murmur; dulness lower half of right lung behind, with crepitus; urine said to have been copious but now scanty, with high specific gravity. Increase of urine under treatment by cream of tartar and digitalis, but she died, January 20, 1873. *Section*—Hypertrophy of heart; hæmorrhagic condensations in right lung; kidneys minutely granular; small pelvic abscess. (See page 63).
9. (*Renal Dropsy, Waxy Disease?*) Margaret M'C., aet. 21, admitted January 13, 1873. Suppressio mensium for 2½ years, since then, occasional hæmoptysis; signs of phthisis pulmonalis; liver perhaps rather large; suppuration in right elbow joint apparently from diseased bone; dropsy for two months, diarrhoea for two months; urine highly albuminous; sp. gr., 1012-1028, usually above 1020, average quantity in five days, 22 oz. in 24 hours; hyaline tube casts. Left in same condition, January 30, 1873.
10. (*Pelvic Abscess—Excessive Albuminuria.*) Mrs F., aet. 20, admitted January 18, 1873. Confined 2½ months ago, since then mammary abscesses and pelvic abscess preceded by rigors; opening of abscess into rectum; supervention of excessively albuminous urine with high sp. gr., 1036-1045, with abundant epithelial tube casts and pus corpuscles; quantity of urine small, latterly slight dropsy. Died February 17, 1873. *Section*—Large abscess in left iliac fossa, extending to thigh and leaking into rectum; left ovary enlarged, but without pus; right ovary with small abscess; urinary bladder intact; kidneys very large, together 23 oz; cortical substance pale and opaque. (See page 55).
11. (*Cardiac, Pulmonary, Renal.*) Mrs B., aet. 55, admitted January 16, 1873. Chronic cough; palpitation for eight years; bronchitic râles and much lividity; heart's dulness increased, and action heaving,

sounds reduplicated; dropsy for five weeks; urine scanty; sp. gr., 1021-1030; albumen at first, latterly little or no albumen; hyaline and granular casts. Treatment by cream of tartar. Dismissed, perhaps slightly improved, February 5, 1873.

12. (*Pulmonary, Cardiac, Renal.*) Catherine S., act. 25, admitted January 23, 1873. Catarrh, general anasarca for three weeks; heart's dulness increased transversely; pulsation in epigastrium; systolic murmur (tricuspid?); pulmonary emphysema. Urine at first scanty, increased to 60 oz. under diuretics; albumen at first abundant, latterly slight; sp. gr. average 1015; hyaline tube casts. Dismissed much improved, February 11, 1873.
13. (*Cardiac, Pulmonary, Renal.*) Agnes L., act. 59, admitted January 28, 1873. For two months catarrh, and for fourteen days oedema; dyspnoea and orthopnoea; bronchitic râles; consolidation of bases of lungs; presystolic murmur; hypertrophy of both ventricles; urine scanty; sp. gr. usually about 1025; moderate albumen, granular and hyaline tube casts. Died, February 11. No *sectio*.
14. (*Emphysema, Cardiac Hypertrophy, Embolism.*) Grace Y., act. 33, admitted February 7, 1873. For three years attacks of cough; three months ago oedema of limbs, which disappeared but returned a fortnight ago; signs of pulmonary emphysema with much lividity; epigastric pulsation and heaving action of right ventricle; urine scanty, sometimes albuminous; sp. gr., 1020-1025; hyaline and granular casts, pus corpuscles. Treatment by gin and other diuretics. Died, February 27, 1873. *Sectio*—Heart 14 oz.; hypertrophy, almost exclusively of right ventricle; lungs very emphysematous; embolic lesion in spleen, several such in kidneys also, some old and some recent. (See page 62).
15. (*Renal Dropsy; Pulmonary Consolidation.*) Mrs K., act. 34, admitted February 14, 1873. Weakness and cough for two years; two months ago pain in loins (from cold) followed by oedema; signs of consolidation upper part of right lung; urine highly albuminous; sp. gr., 1010; hyaline and granular casts. Treatment not recorded. Dismissed well, March 24, 1873.
16. (*Nephritis; Hæmaturia.*) Margaret W., act. 24, admitted March 14, 1873. Four weeks bloody urine, and pain in loins and hypogastrium. Dismissed for refusing the treatment (Ol. Tereb.) ordered, March 20, 1873.
17. (*Cardiac, Renal, Pulmonary.*) Mrs M'D., act. 40, admitted March 20, 1873. Rheumatism, followed by cardiac symptoms, double murmur, oedema; bloody urine, loaded with epithelial casts. Died, March 31, 1873. *Sectio*—Heart hypertrophied 15 oz., chiefly in left ventricle;

- disease of aortic and mitral valves; kidneys slightly enlarged, 12 oz. (See page 63).
18. (*Phthisis, Albuminuria.*) Julia A., aet. 43, admitted March 19, 1873. Signs and symptoms of pulmonary phthisis; diarrhoea; elevated temperature; enlargement of liver, dulness $6\frac{1}{2}$ inches in line of nipple; urine, sp. gr. 1016, albuminous, with epithelial casts. Treatment by tonics. Dismissed in same condition, April 10, 1873.
 19. (*Renal and other embolism.*) Jane W., aet. 22, admitted April 1, 1873. Rheumatism; cardiac hypertrophy and mitral disease; hemiplegia (urine still normal); rigor and pain in left loin, with bloody urine of high sp. gr., and with epithelial casts; subsidence of blood and temporary appearance of pus in urine; subsequent rigors, without urinary disturbance: plugging of right radial. Dismissed improved, July 19, 1873. (See page 44).
 20. (*Paraplegia, Albuminuria.*) Margaret M'N., aet. 33, admitted May 13, 1873. In 1865, general anasarca, treated then with four blue pills, causing salivation; return of anasarca shortly after, but not since then; nervous symptoms two years; paraplegia marked, but not extreme; muscular spasm; urine sometimes highly, sometimes slightly albuminous; usually alkaline, sp. gr. about 1024; abundant triple phosphates. Dismissed as before, July 10, 1873.
 21. (*Pyonephrosis.*) Margaret M'L., aet. 33, admitted July 17, 1873. For eight years frequency and pain in micturition; pain extends down thigh; fulness in side for three months, evidently renal; no lameness; slight febricula, occasional sickness; urine acid on being passed sometimes bloody, always with more or less visible deposit of pus; crystals of urate of soda, oxalates, and uric acid. Dismissed as on admission, July 30, 1873. (See page 51).
 22. (*Renal Dropsy and Cirrhosis of Liver?*) Andrew M'G., aet. 52, admitted October 18, 1872. (Edema for two months; ascites; liver probably small; habits intemperate; congestion of lungs; urine scanty; sp. gr. high; albumen abundant, tube casts hyaline and fatty. Treatment by diuretics; skim milk diet tried. Dismissed to Town's Hospital, February 7, 1873. (See page 75).
 23. (*Renal Dropsy.*) James M'D., aet. 50, admitted October 21, 1872. (Edema two years ago, returned one year ago; ascites; liver small; habits intemperate; diarrhoea; semi-comatose and delirious condition for a day and night; urine highly albuminous; hyaline and granular casts. Treatment by diuretics. Dismissed improved, November 2, 1872. (See page 69).
 24. (*Renal and Cardiac and Pulmonary; Retina affected.*) Archd. S., aet. 32, admitted Nov. 5, 1872. Palpitation and cedema of one or two years'

duration; headache, amblyopia; cough and hæmoptysis recently; hypertrophy of heart; arteries rigid; left lung condensed at base; urine highly albuminous, sp. gr. 1011; retina with hæmorrhages and opaque patches. Dismissed (in six days) November 11, 1872. (See page 70).

25. (*Renal Dropsy*.) Alexander F., aet. 30, admitted November 5, 1872. Rather sudden œdema twenty-seven weeks ago, worse for fourteen days. Treatment by cream of tartar; increase of urine to 61 oz. per day; subsequent diarrhœa, with diminution of urine; hyaline and granular tube casts and fatty epithelium. Dismissed improved, November 30, 1872.
26. (*Ague; Renal Dropsy*.) Daniel B., aet. 32, admitted November 9, 1872. "Malta Fever" in July, subsequent frequent shiverings; renal symptoms probably after this; œdema, ascites, pulmonary congestion, neuro-retinitis. Treatment by diuretics; quinine and iron. Urine at first scanty, highly albuminous, and deficient in chlorides; tube casts hyaline, epithelial, and granular; gradual recovery. Dismissed well, December 19, 1872. (See page 65).
27. (*Renal Dropsy*.) Hugh M'G., aet. 47, admitted November 19, 1872. Œdema, nine days' duration; hypertrophy of heart; arteries rigid; urine copious; hyaline and fatty tube casts, sp. gr. about 1015 (under diuretic treatment); coma for half-an-hour. Recovery, and dismissed much improved, December 19, 1872. (See page 68).
28. (*Renal Dropsy*.) James M., aet. 27, admitted December 2, 1872. Œdema for one month set in with shivering and scanty, and probably bloody urine; urine still with faint blood tinge, and highly albuminous; quantity, after admission, 61 oz. sp. gr. 1012-1022, abundant hyaline and granular casts and blood corpuscles. Treatment by tinct. ferr.; great improvement in urine and symptoms. Dismissed improved, December 27, 1872.
29. (*Tube Casts without Albuminuria*.) John R., aet. 58, admitted January 30, 1873. Complaints and physical signs, chiefly pulmonary; pain also in region of left kidney; albumen in urine for two days after admission; subsequent persistence of tube casts, without albuminuria; sp. gr. usually over 1020. Crystals of oxalate of lime. Dismissed well, as regards pulmonary affection. (See page 59).
30. (*Renal Hæmaturia*.) Samuel M., aet. 42, admitted January 28, 1873. Third attack of hæmaturia, first ten years ago; slight œdema in this attack; pains in groin and thighs; urine albuminous; sp. gr. 1012-1017; chocolate sediment; tube casts, some with blood corpuscles, some only with colouring matter. Treatment by ol. terebinth. Dismissed well, February 25, 1873. (See page 53).

31. (*Pulmonary, Cardiac, Renal.*) David H., aet. 33, admitted February 19, 1873. Chronic cough; signs and symptoms of pulmonary emphysema and bronchitis; lividity, cardiac hypertrophy; murmur after first sound over right ventricle; oedema of legs for six weeks; urine scanty (15 oz.), slightly albuminous; sp. gr. 1027; hyaline and granular tube casts and blood corpuscles. Treatment by cream of tartar, squill and hyoscyamus. Dismissed unimproved, February 27, 1873.
32. (*Pulmonary, Cardiac, Renal.*) Neil L., aet. 70, admitted February 22, 1873. Chronic cough; signs and symptoms of pulmonary emphysema and bronchitis; oedema for twelve months; epigastric pulsation; cardiac murmur after first sound; urine albuminous, sp. gr. 1024, but not recorded in detail. Treatment by expectorants and diuretics. Dismissed much improved, March 22, 1873.
33. (*Pulmonary, Cardiac, Renal.*) Andrew A., aet. 60, admitted February 27, 1873. Subject to cough for two years; signs and symptoms of pulmonary emphysema and bronchitis; cardiac hypertrophy; oedema for six weeks; slight hæmoptysis occasionally; urine slightly albuminous; sp. gr. 1019, hyaline casts and blood corpuscles, epithelial and pus cells. Dismissed in same condition, March 24, 1873.
34. (*Hæmaturia.*) Thomas C., aet. 32, admitted February 27, 1873. Hæmaturia, ascribed to a twist of the body; intemperate habits of patient; urine with much blood, no casts, no crystals; sp. gr. 1032. Treatment chiefly by rest. Dismissed well, March 4, 1873.
35. (*Cardiac, Pulmonary, Renal.*) James W., aet. 65, admitted February 27, 1873. Signs and symptoms of cardiac disease; heart hypertrophied, first sound prolonged; consolidation or collapse of portions of lung; oedema for two months; urine pale, slightly albuminous; sp. gr. 1012; granular tube casts. Treatment by squill, digitalis, and hyoscyamus. Dismissed improved, March 28, 1873.
36. (*Renal Dropsy.*) William R., aet. 9, admitted March 3, 1873. General anasarca four months; no history of scarlatina; oedema of bases of lungs; urine albuminous, with hyaline casts. Treatment by purgative, followed by warm pack and vapour baths, unsuccessful; success of purgation by scammony; subsidence of dropsy and treatment by iron, but urine still albuminous when dismissed on April 14, 1873.

Re-admitted, August 29, 1873, with return of dropsy for last month as formerly, and threatening pulmonary symptoms. Treatment by diuretics, gin, tinct. ferri perchl.; urine at first scanty, with very high sp. gr. 1036-1038; solidifying on heating; decrease of density and of albumen with improvement, sp. gr. latterly 1008-1015; hyaline tube casts and renal epithelium present throughout. Dismissed free from dropsy, but urine still albuminous, Nov. 4, 1872.

37. (*Cardiac, Renal, Pulmonary.*) John B., aet. 60, admitted March 24, 1873. Signs and symptoms of cardiac disease (mitral) with bronchitis and slight consolidation of lungs; cedema for three months; urine albuminous (record imperfect.) Treatment by spirits of nitrous ether and digitalis. Dismissed free from dropsy, and improved as to bronchitis, April 18, 1873.
38. (*Cardiac and Renal.*) John S., aet. 18, admitted March 22, 1873. Acute rheumatism eight years ago and recurrences since; palpitation since then; dropsy three weeks' duration; bronchitic rales; much cedema of trunk; albuminuria, without tube casts. Died, March 29, 1873. *Section*—Adherent pericardium, disease of aortic and mitral valves; nutmeg liver; kidneys hyperæmic and very firm without organic lesion. (See page 62).
39. (*Renal Dropsy.*) James P., aet. 22, admitted April 25, 1873. General cedema (beginning at feet) for three months, supposed to be due to wet; no history of any of the usual causes of waxy degeneration, and no enlargement of the liver; urine highly albuminous ($\frac{1}{4}$ to $\frac{1}{2}$), quantity abundant, average 90 oz.; average sp. gr., 1012; hyaline and fatty tube casts; granular masses (altered epithelium?) Treatment by ammoniated tincture of guaiacum and tinctura ferri perchlor. Dismissed improved, June 7, 1873.
40. (*Locomotor Ataxia, Albuminuria.*) Thomas S., aet. 36, admitted May 12, 1873. Motor disturbances (ataxia) 6 weeks ago; anæsthesia; slight cedema on admission; urine highly albuminous ($\frac{1}{4}$); sp. gr., 1010-1012; pus corpuscles; uræmic convulsions and coma. Died, May 29, 1873. No *section*. (See page 67).
41. (*Locomotor Ataxia, Albuminuria.*) Archibald B., aet. 55, admitted May 12, 1873. Abnormal sensations in limbs for eight months; ataxic symptoms for one month; anæsthesia; strabismus; inequality of pupils; considerable cedema; urine slightly albuminous; sp. gr., 1013-1019; pus corpuscles. Treatment by nitrate of silver. Dismissed slightly improved, May 29, 1873. (See page 67).
42. (*Pyelitis.*) Robert F., aet. 60, admitted June 10, 1873. Hæmaturia occasionally for twelve months; pains in loin and thigh for two months; no dropsy; urine, sp. gr. usually above 1010; abundant sediment of pus; albumen variable in quantity, more or less blood; no tube casts; no crystals. Went out, June 17, 1873. (See page 51).
43. (*Tuberculosis, Albuminuria.*) William C., aet. 27, admitted June 14, 1873. Formerly treated in ward for tubercular pleurisy; on readmission fetid breath, headache; lethargic condition bordering on coma. Treatment by blisters to head; urine (on re-admission) of high sp. gr., 1030; albumen variable (more abundant after blister); hyaline

tube casts, oxalate of lime crystals. Died, June 19, 1873. No *sectio*. (See page 69).

44. (*Double Hydronephrosis*.) William S., aet. 43, admitted June 28, 1873. Illness from injury to leg three years ago; incontinence of urine more or less since then; serious illness with convulsions five months ago; tumour in abdomen (distended bladder) for a year; urine of low sp. gr., slightly albuminous, variably abundant; subsequent alkalinity of urine; uræmia. Died, July 11, 1873. *Sectio*—Enlarged and thickened bladder; dilated ureters; double hydronephrosis. (See page 49).
45. (*Renal Dropsy*.) William M'N., aet. 50, admitted July 15, 1873. General anasarca one month, but previous attack 13 years ago with recurrences since; urine highly albuminous; sp. gr., 1010-1015; granular tube casts; blood and epithelium. Treatment by purgatives, diuretics, and iron. Dismissed improved, August 18, 1873.

VI.—ON THE DURATION OF HUMAN PREGNANCY.

By JAMES GAIRDNER, M.D., *Crieff*.

“UNQUESTIONABLY,” says the immortal Harvey, “the ordinary term of utero-gestation is that which we believe was kept in the womb of His mother by our Saviour Christ, of men the most perfect; counting, viz., from the festival of the Annunciation, in the month of March, to the day of the Blessed Nativity, which we celebrate in December. *Prudent matrons, calculating after this rule, as long as they note the day of the month in which the catamenia usually appear, are rarely out of their reckoning; but after ten lunar months have elapsed, fall in labour, and reap the fruit of their womb the very day on which the catamenia would have appeared had impregnation not taken place.*”

I do not propose to enter into any discussion on the first half of this quotation, but I would have it understood that I thoroughly homologate the latter half, which I have underlined, and which I wish to take as the subject of this essay.

I would, however, here venture on a slight correction, or rather interpretation of a phrase in the latter half—viz.,

"Lunar months." I cannot suppose that this celebrated author meant by this term that the moon had any influence over menstruation, else we should have all women menstruating at the same time, but I shall take it for granted that he simply understood a lunar month to be a catamenial month, or the number of days from the commencement of one menstrual period till the commencement of the next—a period varying very much in different individuals.

In predicting the day of confinement, or more correctly the day on which true labour pains will set in, according to Harvey it is necessary, firstly and most importantly, that the matron be prudent, that is, that what she states can be accurately depended on. Secondly, that she note the day of the month in which the catamenia usually appear; this gives not only the day on which the matron has last commenced to menstruate, but also gives the length of the catamenial month, which multiplied by ten gives the duration of pregnancy. For example, Mrs B. H.'s catamenia appeared for the last time on November 11th, previously to this they had appeared every twenty-eight days with great regularity, the duration of pregnancy was calculated to be 280 days, and labour pains set in on the morning of the 18th of August, and her child was born the same evening.

The periodicity of menstruation is a point that seems to be almost entirely overlooked in calculating the duration of pregnancy, but in my opinion it is a very important question.

In the ordinary text-books of physiology we are told that menstruation generally recurs once in twenty-eight days, sometimes a little earlier, sometimes a few days later; but I believe that the recurrence of menstruation is an extremely variable thing, that it may recur every twenty-seven or every twenty-nine days, as often if not oftener than every twenty-eight days. I further believe that menstruation must in many cases be measured by so many days and so many hours, *e.g.*, on inquiring of Mrs A. J. how often she was unwell, and when she last commenced to be unwell, she stated that she went twenty-eight days, and that she

last became unwell on a Tuesday. On inquiring more carefully whether she always had become unwell on a Tuesday, which would be the case if she went exactly twenty-eight days, she answered that two or three periods ago she became unwell on a Wednesday, and some time before on a Thursday, showing conclusively that she became unwell not every twenty-eight days, but every twenty-seven days and so many hours. Her confinement, accordingly, happened three days before the 280 days. In the same way a woman may become unwell every twenty-nine days and a half, or every thirty days and six hours.

In predicting the day, hours are frequently a source of fallacy. Suppose it should happen that a woman becomes unwell every twenty-eight days and twelve hours; if we simply multiply the days by ten we anticipate the confinement by five days, the multiple of the twelve hours.

Not only does menstruation differ in different individuals but it may vary in the same person—*e.g.*, Mrs C. M. became pregnant for the first time. On asking her for particulars, she stated that she always went thirty days, and that she last commenced to be unwell on the 10th of October. Her confinement was accordingly predicted on the 6th of August, and on that very day true labour pains set in, and she was delivered on the 10th. She became pregnant a second time, and on giving notice of her confinement, she stated that subsequently to giving up nursing she menstruated every twenty-eight days. She last commenced to menstruate on 27th February; true labour pains set in on the 3rd, and she was delivered on the 4th of December.

Carrying out Harvey's idea, it is generally admitted by practical accoucheurs that abortion is more likely to occur at a time when menstruation would have commenced. Of course abortion may be brought on at any time by an exciting cause, so in the same way the confinement may happen some days sooner through some cause, as overwork.

I have made notes of the day predicted and the result

in sixty-four cases, of which the following is a summary:—

In 7 cases the confinement took place on the exact day predicted.

In 9 cases there was an error of 1 day—viz., in 5 sooner; in 4 later.

4	"	2	"	2	"	2	"
4	"	3	"	1	"	3	"
9	"	4	"	5	"	4	"
8	"	5	"	4	"	4	"
4	"	6	"	2	"	2	"
14	"	7-14	"	5	"	9	"
3	"	14-21	"	3	"	0	"
2	"	21-27	"	0	"	2	"

From this table it will be seen that in seven or nearly one-ninth of all the cases, the day was exactly predicted; and that in thirty-three, or more than one-half, the day was successfully predicted, the greatest error being four days. The average error was 6.6 days; and the error was about equally often in the direction of anticipation and postponement.

VII.—OVARICTOMY: REMOVAL OF BOTH OVARIES. PERFORMED AND TREATED ANTISEPTICALLY.

By WILLIAM MACEWEN, M.D., *Casualty Surgeon, Central District of Police.*

ELIZABETH N., aged 29 years, a domestic servant, was admitted to the Town's Hospital, Glasgow, suffering from an abdominal tumour. On the morning of the 30th September, 1873; the following notes of her history and condition were made:—

History. Nothing definite could be elicited regarding her parental constitution, her mother having died during the infancy of patient; and her father, who had been a soldier, succumbed to cholera when she was five years old. Her mother had seven of a family, all of whom, with the exception of one whose death is ascribed to dropsy, are alive and healthy at the present time.

Patient had led a chequered life from an early age up to the present; and, though choosing to be designated "domestic servant," she as often acted in other capacities.

She was born in Glasgow, and was seldom or never out of it. During childhood she may have had the ordinary troubles incident to that period, but otherwise she was healthy, till attacked by enteric fever at the age of fifteen, from which she recovered without any permanent detriment.

Menstruation commenced when she was fourteen, and has since continued generally normal in quantity and periodicity. When twenty-two she cohabited with a sailor, and continued to do so till she was twenty-seven. Her menses during those five years were uninterrupted; she had no children, and never aborted. Once she had a gonorrhœa, for which she was treated in the Lock Hospital, where she was cured and dismissed in "two days" from the date of her admission. She had no genital sores at any time. She remembers of having had neither skin eruptions, falling out of the hair, sore throat, nor any other syphilitic sequelæ.

Eighteen months ago (April, 1872) she had an attack of cramp in the abdomen, accompanied by vomiting, which lasted several days; and after they subsided she discovered a swelling situated in the middle line above the symphysis pubis, that felt "like a hard round lump." This gradually increased, until it attained its present dimensions. On more particular and pointed interrogation as to whether she ever found the tumour more on one side than on another, she replies decidedly in the negative, stating that, as far as she could judge, it was always in the middle line of the abdomen. Since that attack, though inconvenienced and encumbered by the growing weight and bulk of the tumour, and the derangement caused by its pressure on the surrounding organs, she enjoyed complete immunity from pain till about four months ago, when she began to experience fleeting lancinating pains all over the surface of the tumour, which then occupied the greater part of the abdominal cavity. Those pains have continued with intermissions, at one time recurring daily for an hour or two, while they might be absent for several days at another. The last of these attacks was accompanied by considerable constitu-

tional disturbance, and the pain was excessively acute. It lasted several days, and obviously diminished her strength. During the whole period of the tumour's growth the menses occurred regularly, but have been much diminished in quantity, no menorrhagia having taken place at any time. There had been considerable gastric derangement during the last four months, with gradually increasing frequency in vomiting, till now it is with difficulty that she can retain food of any kind. She also states (unsolicited) that whenever she is "excited or annoyed" she immediately vomits.

She is a woman below the average height, of a sallow complexion, with black hair thickly interspersed with grey, the change in the colour of the hair being contemporary with the detection of the tumour. She walks with the laboured pompousness, and wears the exaggerated aspect of a woman far advanced in pregnancy; the anxious eye being rendered more prominent by the emaciated and sunken cheek, and the conjunctival whiteness floating over a hollow, clouded lower eye-lid. Her under-jaw droops, and the partially open mouth exposes a tongue which, from its fulness and apparent bulk, shows a tendency to protrude. The nasal alæ, notwithstanding the open mouth, expand with each laboured respiration. The mammæ are in no way enlarged, and display no areolæ. Her extremities are attenuated, and on the least exertion palpitation sets in, with tendency to faintness and feelings of prostration. A whitish fur coats her tongue, there being none of the redness present characteristic of such cases. Her appetite is gone, and when it even permits of her taking a little food, it is as often rejected as retained. Her pulse is weak, and ranges from 96 to 100. She feels feverish, cannot lie in bed with ease, and when she does so then only on her *right side*. She prefers sitting on an easy chair, where she obtains snatches of troubled sleep. Her bowels are regular, but she is necessitated to micturate at very short intervals. She says that life is a burden to her.

The surface of the body generally is of a yellowish

colour, but is free from stains or blotches of any kind. The subcutaneous cellular tissue is scant. There is no oedema detectable anywhere. The abdomen is much enlarged, and the veins in front are distended and swollen. The tumour appears to occupy the whole abdominal cavity, and is most prominent near the umbilicus. Its antero-posterior diameter is greatest, and there is neither flattening from before backwards, nor bulging of the sides of the abdomen. The dimensions are as follows:—

- Girth at level of most prominent part of tumour, $38\frac{1}{2}$ inches.
- Girth at level of ensiform cartilage, 33 inches.
- Distance from ensiform cartilage to level of umbilicus, 7 inches.
- Distance from level of umbilicus to symphysis pubis, 8 inches.
- Distance from R. S. S. P. of the ilium to umbilicus, 9 inches.
- Distance from L. S. S. P. of the ilium to umbilicus, $9\frac{1}{2}$ inches.
- Height of woman standing erect, 58 inches.

As will be seen from the above, the umbilicus is carried half-an-inch to the right side of the mesial line. In front the abdominal parietes are abnormally thin, and, though greatly distended, seem to be unconnected with the tumour, the round smooth walls of which, free from inequalities or lobular divisions of any kind, can be distinctly felt beneath. On filliping, a distinct wave of fluid is transmitted from the one side of the tumour to the other. Percussion shows a dulness in front, extending from the symphysis pubis to the clear lung sound above: at either side, the still more dull note of the liver and the tympanitic sound of the stomach appear higher up, and confined to a more limited area than usual. A clear note is elicited in the lumbar region, but on the left side it is tympanitic and extends over a greater area than that on the right, which is at times but indefinitely clear. The limits of the thorax are encroached upon; the interspaces between some of the upper ribs seem to be lessened, while the lower ribs are distended outwards and somewhat fixed. The area of cardiac dulness is carried upwards, the apex beat impinging against the fourth rib, the impulse being most perceptible immediately above that rib, though also apparent between the fourth and fifth ribs.

Auscultation gives negative evidence as far as the abdomen is concerned. No crepitations can be detected over the surface of the tumour.

The respiratory sounds are feeble over the lungs generally. There is a faint ventricular systolic murmur, heard over the base of the heart and great vessels, which, taken in connection with her state generally, is most likely to be functional. *

Rectal and Vaginal Examination. The vaginal and rectal examination shows what might be considered as a virgin uterus, almost in its normal situation though lying with a degree of obliquity, the fundus being thrown a little to the left of the mesial line. Mobility is scarcely appreciable. The uterine sound shows the cavity of the uterus to be about one inch and a-half. The tumour is felt dipping down into the pelvis, above, partially behind and on either side of the fundus of the uterus. To the left of the uterus, partially beneath and considerably behind the fundus, is a slightly mobile tumour, fully larger than a hen's egg, which afterwards proved to be the left ovary. As far as can be discovered, there are no bands of adhesion, but the bulk of the tumour and its extensive occupation of the parts preclude any certainty on this point, as well as on the question of the general mobility of the tumour itself.

She does not evince much pain on pressure of the tumour. The urine subsequently was found to be albuminous, but contained no tube casts.

This being the state of matters, and there being no doubt on the mind of Dr Robertson, from independent examination prior to the period of my first visit, as to the nature of the tumour, the question of treatment next presented itself. After several consultations, in which, besides other points, the palliative operation of paracentesis *versus* ovariectomy, was fully discussed, both Dr Robertson and myself concluded that the latter should at once be proceeded with. This conclusion was supported by the ready acquiescence of the patient, who, after having been apprised of the extreme

* On examination at a later date this murmur was not detected.

gravity of the operation, yet eagerly begged that it should be performed.

Patient having just menstruated it was thought advisable to fix the 4th October for the operation. The preparatory treatment consisted in the administration of a purgative, and for this purpose tincture of rhubarb was selected, on account of its tonic and astringent after effect on the intestines. On the evening immediately preceding the operation she had a warm bath, and fresh under clothing, bed clothes, &c., were supplied. A single well lighted and ventilated apartment was obtained, and arrangements were made for the maintenance of the temperature about 65° F. Two beds were placed in the room with new mattresses and blankets. Care was taken to have the person and clothing of those who were to be in attendance perfectly fresh and clean. The instruments were all steeped in 1 to 20 watery solution of carbolic acid preparatory to being used.

Operation [4th October, 1873.] The patient slept little the previous night. From the state of the rectum it was not found necessary to give an injection. She was dressed in new underclothing, with flannel drawers, and placed on the operating table in the room she was afterwards to occupy. Drs Robertson, Weir, Donald, and Mr Andrew were present. Dr Weir administered the chloroform. The operation was performed in the usual manner, with the exception of the antiseptic precautions. A carbolized atmosphere was produced by means of the spray; the instruments, sponges, and the hands of the operator and assistants were bathed in heated carbolized solutions before coming in contact with the parts. The incision was made in the *linea alba*, commencing about two inches from the symphysis pubis, and extending upwards for three and a-half inches; sufficient to admit the left hand of the operator. There was little or no bleeding, the tumour was easily reached, and its anterior surface found to be free from adhesions. The cannula and trochar of Spencer Wells was inserted through the walls of the tumour, but, contrary to expectation, no fluid escaped. After manipulating the trochar within the cannula several times, in the

hope of clearing any occlusion, and after various other attempts in the same direction proved futile, the india-rubber tube was detached, and the trochar was seen to be partially filled with a grumous fluid of a yellowish colour. This fluid, however, only trickled slowly over the lips of the trochar, a few drops at a time, and while means were being devised for the purpose of clearing the obstruction, the difficulty was solved by an expulsive effort of nature. The patient took a fit of coughing, after the first expiratory effort of which, a report took place, and a shower of round bullet-like bodies, along with a grumous fluid, was shot out with a force that carried them a considerable distance beyond the foot of the operating table. Hundreds of these pellets were discharged and strewn all over the floor, accompanied by a most foetid odour. The india-rubber tube was again re-adjusted, but the coil of wire in its interior was found to prevent the exit of these pellets, so that it had again to be removed, and the discharge was caught in a basin as it flowed from the trochar. Dr Robertson, meanwhile, had carefully guarded the abdominal opening, so that none of the contents of the tumour were allowed to enter. The greater part of the contents of the cyst was soon emptied, but on introduction of the hand a small portion of the cyst behind and to the right side retained its distended form; and though there was no inequality in the external surface, yet this portion seemed to be separated by a septum from the main body of the tumour. This, however, was of such a size as to admit of its being easily removed along with the rest of the sac. The only adhesion was an omental one behind, about four inches in extent, which was separated, ligatured in segments with fine cat-gut, and returned. Attached to the under side of the tumour, partially encircling it, and passing toward the pedicle, lay, what bore no distant resemblance to a fold of intestine, but which was readily seen to consist of a greatly dilated fallopian tube, the walls of which were in many places thin and transparent, and here and there thrown into cyst-like expansions. The pedicle was short, broad, and highly vascular. A loop of ecraseur wire was placed round it, to

act as a clamp for the moment, and the tumour cut away. One of the strongest cat-gut ligatures was then applied to the pedicle and tightened, but on relieving the wire of the *ecraseur* it was found insufficient to control the hæmorrhage. The pedicle was therefore transfixed in three places, and secured by four antiseptic cat-gut ligatures. The wire of the *ecraseur* was withdrawn, the ligatures cut short, and the pedicle returned. The left ovary was now found to be considerably enlarged and well advanced in cystic degeneration. Its pedicle was transfixed, two ligatures applied, and the ovary removed. The whole of the parts exposed were now carefully cleansed by hot antiseptic sponges, the pelvis receiving special attention, so as to remove any fluid which might have lodged there. The lips of the external incision were then brought together by four deep cat-gut sutures made to embrace the whole thickness of the abdominal wall, while two superficial sutures of silver wire were placed between these, so as to bring the edges into closer apposition. The external parts were then thoroughly cleaned, the wound dressed antiseptically, and the patient placed in a warm clean new bed, where the effects of the chloroform soon passed off. The hæmorrhage did not amount to more than two ounces during the operation, yet as she lay in bed her appearance was that of extreme exhaustion; her lips were pale, cheeks blanched, and extremities cold. She spoke in an under tone, and seemed very feeble—pulse 136, weak and thready. The temperature of the room was raised, alcohol was administered in dessert spoonfuls every hour, and half-grain morphia suppositories were given every four hours. She soon rallied from her collapsed condition, after which the temperature of the room was slightly reduced. Instructions were left to give nothing by the mouth except in dessert spoonful doses. The first vomiting occurred twelve hours after the operation, when a digression from this instruction had been made by allowing her to take “a drink” of beef tea, which was soon after rejected. Her urine was withdrawn every six hours.

In the after treatment one of the principal objects was the maintenance of the strength, and for this purpose stimu-

lants and nutritious fluids were administered. The rate of the administration of the former was readjusted every six hours in accordance with the wants of the patient: the actual quantity used ranging from three to six ounces of brandy daily, during the first week, and about three ounces thereafter. Milk and lime water were given every five minutes, in teaspoonful doses, to allay the thirst. Vomiting only occurred when patient was indulged in her desire for a drink, and was treated by ice, *swallowed* in little pieces, and rectal injections of beef tea and eggs: the vomiting being regarded in part as an indication of weakness, as well as a sympathetic action. In giving the injections, which were frequent, a larger quantity than two ounces was never administered at once. A very important item consisted in the regular introduction of the rectal tube, before the injection was given, to relieve flatulence, and to take away any unabsorbed portions of the previous injections which might remain. It was also introduced at other sundry times, when flatulence became annoying, and afforded at all times very great relief. Every alternate day, and sometimes even daily, she was gently lifted into a fresh bed, after which, from the luxury thus afforded, she generally fell asleep.

The pulse averaged 130 for the first two days from the operation, after which there was a steady fall till it reached 100 on the seventh day. The rectal temperature showed corresponding diminution as far as the seventh day, falling from F. 103·60° to F. 100°, with slight morning and evening fluctuations, after which there was a rise to F. 101·40°, and a continuance of that rate till the fifteenth day. At first she slept two to four hours daily, besides dosing many others: and to encourage this the room was kept darkened and absolutely quiet. Her skin was generally moistened with perspiration. She micturated voluntarily on the third day after the operation, and continued to do so till the sixth. On the sixth she had several loose motions, the stools being light, clay-coloured, and watery. Previous to and during the passage of these she experienced severe pain. After this her urine had again to be removed by catheter, and was

not passed freely till the fifteenth day after the operation. It will thus be seen that the febrile symptoms decreased till the sixth or seventh day after the operation, when some remained stationary, while others increased up till the fifteenth.

On the third day after the operation, the wound was united save about one-quarter of an inch at its lower border, where the edges were slightly separated, and the last stitch was covered by a crust of serum. On the sixth day, therefore, in trying to discover the cause of the unfavourable symptoms, the wound was again examined, but there was not the slightest inflammatory appearance visible. Douglas's space was frequently and carefully examined by vagina and rectum, but no accumulation of any kind could be detected. On the tenth day a circumscribed, apparently solid mass, was felt immediately above symphysis pubis, extending to about two and a-half inches upwards, and about two inches on either side of the linea alba. It seemed to have little or no mobility independent of the abdominal wall; and, as far as could be ascertained, it was in close contact with and fixed to it. On the fourteenth day after the operation the external surface of the wound seemed closed and firm along its whole extent; but on the fifteenth the antiseptic gauze was for the most part saturated with a thick claret-coloured fetid discharge. Under antiseptic precautions, about an ounce of the same matter was taken from an opening corresponding in position with the lower stitch of the wound. This appeared to come from the tumour, which was felt to lie immediately beneath the walls of the abdomen, and to have no communication with the abdominal cavity—in fact, to be an abscess, or, more properly, a collection of fluid adhering to, and immediately beneath, the abdominal walls. This was dressed antiseptically. The second day after, though the dressings were saturated, on pressure not more than two drachms of discharge presented itself. From this date all the febrile symptoms diminished, the pulse and temperature fell, the pain and restlessness passed away, and the patient could micturate freely. The tongue cleaned, her appetite returned, and her bowels acted normally. She rapidly gained strength, and the wound,

though staining the dressings for some time, soon healed. She was kept in bed for the first four weeks, though during the latter portion of that time she was clamorous to get up. On the fifth she was allowed to rise, and is now (eight weeks after operation) quite able to walk freely about, and feels well, though still weak.

A small quantity of mucus has been the only vaginal discharge since operation.

Remarks.—The history affords a good example of the influence exerted by the brain over the visceral portion of the sympathetic. The stomach already rendered irritable, on account of its disturbed position and relation to other parts, was probably, therefore, more sensitive, and acted more promptly on the communication of any irritation through the cerebro-spinal system from the brain, induced by circumstances occasioning annoyance or rousing anger. The change in the colour of the hair, though appearing at the same time as the detection of the tumour, was much more probably due to deficient nutrition than to mental causes. The evidence deduced from the history of the growth of the tumour gave no information on some points, or, if any, only misleading. Reliance had to be placed entirely on the physical signs for the diagnosis of the particular ovary to which the tumour belonged. From these, though not very explicit, Dr Robertson and myself were inclined to believe that the tumour had originated in the right ovary, which afterwards proved to be correct. Aspiration was thought of, but abandoned, partly on account of the unfavourable results of the cases given in M. Dieulafoy's "Treatise on Pneumatic Aspiration," and partly for the causes which formed the grounds of objection to the performance of paracentesis. The latter operation, in the present case, at the very best, would have afforded but temporary relief, to be followed soon after by the diminution of the already enfeebled strength through reaccumulation of the fluid, the enlargement of other cysts, and the nervous strain dependent on the suspense thus produced. The patient's misery thereby would be prolonged; she would be necessitated to submit to the radical operation at a more advanced age when in a much more reduced condition, and consequently with a prognosis of much greater gravity. Besides the risk incurred from peritonitis fol-

lowing the puncture and terminating possibly in death, the puncture itself would give rise to adhesions of greater or less extent, which might afterwards retard the operation ; and even should it not do so, the separation of these adhesions would expose a large number of torn and lacerated capillaries ready to imbibe any pus that might be found, and, through absorption, induce one of the greatest scourges to the success of such cases—pyæmia. The blocking of Spencer Wells' cannula (a tube having a calibre several times that of the ordinary cannula for paracentesis) demonstrated how futile alike aspiration and paracentesis would have been. The largest tubes of the aspirator would easily have been blocked by the grumous fluid and solid particles.

Feeling complete assurance in the trustworthiness of the antiseptic cat-gut, it was adopted as the means of securing the pedicle, notwithstanding the opinion of many authors to the contrary. As far as the present operation goes, the cat-gut was found in every way suited, and no untoward circumstance arose from its use. There was at least a dozen ligatures of various strengths of cat-gut used, and none of them were found to have given way. The cat-gut stitches were not absorbed before the end for which they were intended was served. After bringing together the three upper stitches of the external wound, the gut left for the fourth stitch was found inadvertently to have been extracted from its hold in the wound, and the parts were necessarily stretched in the re-adjustment of this portion. It may have been due to this cause, that the small portion of the lips at the lower extremity of the wound had slightly separated superficially. The discharge may have originated in effusion from the pedicle, agglutinating itself in the first place to the abdominal wall, and afterwards from accumulation of fluid between the wall and the pedicle, giving rise to inflammation, resulting in the increase of febrile symptoms, derangement of the bowels and bladder, and probably also in organic adhesions between the pedicle and abdominal wall. As to the fetid odour of the discharge, it is by no means necessary to suppose that this resulted from decomposition, as abscesses near the abdominal cavity are generally fetid.

As to the pathology of the tumour itself, it seemed to consist of an **adenoid multiple cyst**, the contents of which were made up of a **viscid, ropy, highly albuminous fluid**, in which **granules of a yellowish grey colour** floated, having an **oleaginous touch**, and of which the pellets seemed to consist. The pellets varied in size from that of the granules themselves up to three times the bulk of an ordinary blue pea. They appeared to be about the same specific gravity as the fluid itself, as they floated through it, neither rising to the top, nor sinking to the bottom. They were beautifully rounded, having smooth, polished, yellowish-white surfaces. The formation of these pellets can easily be conceived by the coalescence of several adhesive granules, and these gradually augmenting the size of the pellet as they moved from place to place, coming in contact with, and attaching by, the force of cohesion other granules, as a snowball does flakes of snow—the motion through the fluid and the mutual trituration producing the polished rounded surface.

The microscopic appearances presented by the grumous fluid were very varied. Among the crystalline forms no trace was found of cholestrine so common to these fluids, but there were numerous crystals of leucine, margarine, tyrosine, and hæmatin; interspersed with oil globules, blood discs, pus corpuscles, and pavement epithelial cells, the latter for the most part in a state of fatty degeneration. Granular corpuscles, somewhat resembling those claimed by Dr Drysdale (of Philadelphia) to be pathognomonic of ovarian fluids were also present.

VIII.—PERFORATE FORAMEN OVALE IN A FATAL CASE OF ENTERIC FEVER.

Reported by ARCHIBALD CAMPBELL, *Fever Assistant, Royal Infirmary.*

ELIZA MACK., aet. 14, one of twins, factory worker, admitted into the Fever Wards of the Hospital, Sept. 4, 1873, suffering from enteric fever, on eleventh day of illness. On the evening of her admission the temperature was 100°. On the following morning, 102·1°; the next evening, 103·6°.

Eight days after admission (nineteenth day of illness) the temperature fell, and she rapidly improved.

On the twenty-fourth day of illness the temperature began

to rise, and for three consecutive days, the evening temperature was as high as 102° . At this time, patient complained of great sickness, and persistent vomiting followed taking of food. She also complained of a severe pain over the region of the heart. On percussion, the cardiac dulness was found to be increased in area and also in intensity. On auscultation a murmur was heard accompanying the first sound, but not of a very definite character. The cardiac action was laboured, tumultuous and rather hurried. Patient suffered much from breathlessness. Her twin sister, admitted into the ward at the same time, and suffering from the same fever, but now convalescent, informed me that she had been subject to attacks of breathlessness from childhood. The skin and lips became livid. At this period she was seen by my friend Mr J. T. Whittaker, senior assistant, who, after examination into the case, suggested the probability of a patent foramen ovale.

The patient gradually sunk, unable to take any nourishment, the face wearing an anxious expression, the tongue coated and dry.

At the autopsy, over and above the intestinal results of enteric fever, examination revealed great effusion into the pericardial sac. The heart, upon opening that organ, was found nearly



normal, but in the *fossa ovalis* were found four perforations, evidently congenital, from their thickened rounded and smooth edges, as well as the thickened fibrous bands surrounding them.*

* The drawing was kindly made for me by Mr Whittaker, from the specimen in his possession.

The remarks to be made on the above rare case are that the only evidence during health suggestive of organic lesion, was the attacks of breathlessness, and the fact of cyanosis appearing when the action of the heart was impeded by the pericardial effusion.

Reviews.

- I.—1. **THE WEST RIDING ASYLUM MEDICAL REPORTS.** *Edited by J. CRICHTON BROWNE, M.D. (especially the papers by FERRIER, HUGHLINGS JACKSON, and CRICHTON BROWNE).* London: 1873.
2. **A SYSTEM OF MEDICINE.** *Edited by DR J. RUSSELL REYNOLDS (especially the article "On Convulsions," by DR J. HUGHLINGS JACKSON).* Second Edition. London: 1872.
3. **A STUDY OF CONVULSIONS.** *By J. HUGHLINGS JACKSON, in Reports of St Andrews Medical Graduates' Association.* Vol. III. 1870.
4. **THE PRINCIPLES OF PSYCHOLOGY.** *By HERBERT SPENCER.* Second Edition. London: 1870.

HOWEVER much one may differ from the general tendencies of the philosophy of Mr Herbert Spencer, and the theory of evolution on which it is based, it is hardly possible to avoid admiring the manner in which that writer is able to grasp the facts of all domains of physical science, and group them together into apparently natural systems. Of none of his generalisations, perhaps, is this more true than of his admirable description of the general function and structure of the nervous system in the first volume of his "*Principles of Psychology*."* For even the scientific reader we hardly know of any more succinct and convincing description of the essential structure and function of the nervous centres and their connections.

He points out, to begin with, that in animals the size of the nervous system as compared with that of the entire body is in proportion in the first place to the activity of the animal—that is to say, to the amount of motion which it evolves; and, in the second place, to the variety in kind of the motions of which it is capable. Or, to put it in his own

* Dr Hughlings Jackson, in a foot-note to a recent paper, says:—"The study of cases of disease of the nervous system appears to me to supply continual illustrations of the correctness of many of Spencer's deductions."—*British Medical Journal*, May 10, 1873. p. 533.

words, "But after all modifying causes have been allowed for, there remain substantially intact, the fundamental relations set forth—namely, that wherever much motion is evolved, a relatively large nervous system exists; that wherever the motion evolved, though not great in quantity is heterogeneous in kind, a relatively large nervous system exists; and that wherever the evolved motion is both great in quantity and heterogeneous in kind, the largest nervous system exists." (p. 13.)

He then proceeds to show how the heterogeneity of the motions should involve increased bulk of the nervous system. In the simplest nervous system we have merely a ganglion with afferent and efferent nerves, and all the action which can take place here, is the most rudimentary reflex action. "These coupled nerves with the ganglion cell acting as a direct or indirect link between them, recurring everywhere in substantially the same relations, appear to form a compound structure out of which the nervous system is built—its unit of composition. But this is not so." In order to have what Spencer calls the "unit of composition" of the nervous system, it is necessary to add a *centripetal* nerve. That is to say, we require not simply an apparatus which gives us reflex action, but above this a higher arrangement which will co-ordinate the various reflex actions. This higher action is ensured by the communication (by means of the centripetal nerve) of lower with higher ganglia. The lower ganglion may act independently of the higher in the way of simple reflex action, but on the other hand, any co-ordinate action of a number of ganglia of the first order, must be brought about by means of their communication with a ganglion higher than these. And as the complexity of the action increases, it is easy to understand how there should be required successively higher orders of ganglia, the first order, let us say, being concerned simply with reflex action, the order above that, co-ordinating the simplest actions, and a third order rendering possible co-ordinations of a still higher and more complex kind. The idea at the root of this general statement of the structure of the nervous system is well expressed in a concrete instance cited by Mr Spencer.

"Each sucker on any arm of a cuttle-fish has a ganglion seated beneath it. To this descend the afferent nerves that are affected by touching the sucker; and from it ascend the efferent nerves distributed to the muscular fibres of the sucker. These form a local nervous system which is experi-

mentally proved to have a certain completeness in itself. But now from the ganglion underneath each sucker, fibres run along the arm, in company with fibres from all similar ganglia in the arm; and this bundle of centripetal fibres eventually reaches a ganglion at the base of the arm. Each arm, similarly constructed, thus has a chief nervous centre in which fibres from all minor nervous centres are brought into communication. Further, all round the ring formed by the united base of the arms, there runs an annular commissure connecting these superior ganglia, and then from each of them is given off a bundle of fibres that proceed centripetally to a still higher centre—the cephalic ganglion; where, consequently, nerves from all the arms are brought into direct communication with one another, and also into communication with nerves arriving from ganglia in other parts of the body. Omitting details and qualifications not essential to such a conception as concerns us here, we thus see that *in nervous structure there is a centralization and re-centralization that is carried far in proportion as the organization is high.*”*

If this progressive complexity of the communications is visible in three different grades in such an animal as the cuttle-fish, we can easily understand that as we ascend in the animal kingdom, and as consequently the relations are increased and complicated, there will be still greater increase, both in the number of the centres in each grade, and it may be in the number of grades. And when we come to the highest animals and finally to man, we find the nervous system of enormous bulk, proportionate to the size of the body, but also of a complexity which has baffled and still baffles the researches of anatomists and physiologists. But even in the nervous system of the higher animals and of man we can distinguish, though perhaps imperfectly, the successive grades or orders of nervous centres. We have the efferent or sensory nerves running in from the peripheral parts to the spinal cord, and there connected with afferent or motive nerves by means of ganglion cells, thus forming in the cord a series of nerve centres, which as proved by observation in cases of injury to the cord, are capable of independent (reflex) action. These centres in the cord may be denominated of the first grade, and are in great part mutually connected by fibres running from one lateral half of the cord to the other, and longitudinally (transverse and longitudinal commissural fibres). But these inferior ganglia in the spinal cord are further connected with relatively superior ones by what were called centripetal fibres. The first of these relatively higher centres is the medulla oblongata and lower part

* The Italics are ours.

of the pons varolii. These parts are distinguished from any given individual centres in the cord, in the first place by their greater size, and in the second place by the multiplicity and variety of their peripheral connections. The successive centres in the cord have only relations with limited regions of the body. The lumbar swelling, for instance, must be looked on as a series of centres, and yet it has only connections with the legs and lower parts of the body; and similarly the connections of the various portions of the cord are limited. But the medulla oblongata is brought into relation, not with any particular region, but with the entire limbs and body, as well as certain organs of special sense, and the more important viscera. And this connection is not apparently direct, but is effected by means of communications with those centres which are relatively lower, the communications being formed by what Spencer calls centripetal nerves. The medulla oblongata is thus a centre by which these lower and local centres are united into one system.

But above the medulla oblongata and related to it as well as perhaps directly to the lower centres are ganglia forming the cerebrum and cerebellum, and which in man attain such preponderating dimensions. The difficulty of tracing the anatomical connections of these various higher centres seems insuperable, "but their connections with the subjacent minor centres and with the *medulla oblongata* are such as to make it certain that through the intermediation of these, they communicate with the whole peripheral nervous system; and are places in which centripetal fibres from centres of both the first and second orders, joined possibly with some simply afferent fibres, are brought into various relations; relations, however, that most likely differ in their natures from those established in inferior centres." It is this notion of the great cerebral centres as places in which the impressions from all parts of the periphery are received and co-ordinated in the highest possible degree, which seems to us to be of peculiar importance at the stage to which cerebral physiology and pathology have now arrived. And the notion also involves this other, that the highest centres act on the lower, and by means of them on the most distant and minute parts of the body. The importance of this view dwells chiefly in the fact that, according to it, the connection between the cerebral and the lower centres is not a distant and accidental one, but that they are related in the most direct and intimate way; that, in fact, the cerebral centres are simply highly developed and complicated additions to these lower ones.

This observation now leads us on to remark on the newest and most striking result of cerebral physiology—namely, that

these same cerebral centres are also motor centres. It has been hitherto customary to look on the cerebral hemispheres as intimately connected with the mental faculties, as in a manner the seat of intelligence; and, hitherto, experiment has seemed to deny that they are at all the seat of motor centres. If we look at the principal text-books of physiology in this country, or in Germany, we find this statement borne out. Carpenter, after he has shown on various grounds how the cerebrum is intimately related to intelligence as distinguished from instinct, goes on to assert that "all the results of experiments concur to establish the fact that no irritation, either of the vesicular or of the fibrous substance, produces either sensation or motion. These results are borne out by pathological observations on man; for it has been frequently remarked, when it has been necessary to separate protruded portions of the brain from the remainder, that this has given rise to no sensation, even in cases in which the mind has been perfectly clear at the time, nor has any convulsive action been produced."* Otto Funke, in his great work on Physiology, also remarks the fact that, according to almost all observers, irritation of the hemispheres produces neither muscular contraction nor feeling of pain. He is rather more cautious than Carpenter in expressing the relation of the cerebral centres to muscular contraction. He states, however, that "probably the immediate central apparatus of the motor and sensitive nerves lie in the grey matter of the middle structures of the brain, and stand only mediately connected with the grey substance of the cerebrum."†

It was therefore very much at variance with the prevalent view, when Hughlings Jackson began to assert on the basis of clinical and pathological observation that the grey matter of the convolutions contains motor centres. The general incredulity with which this view was received must now give place to thorough conviction since the publication of the experiments of Ferrier, which in so many points confirm the views of Hughlings Jackson.

It seems, then, that the grey matter on the surface of the convolutions contains centres for distinct muscular action, and that these centres are localised in definite parts of the convolutions. The electric stimulation of these centres produces movements of the muscles of the body, contrary to what has been hitherto supposed. It is important to bear in mind that the movements produced by such stimulation are of a kind

* Carpenter's Principles of Human Physiology, 7th ed., 1869; p. 645.

† Otto Funke, *Lehrbuch der Physiologie*, 2d ed., 1866. Vol. II.; p. 723.

very different from those produced by the stimulation of a motor nerve. As Ferrier observes, "It will be seen that the movements recorded in the above experiments as resulting from excitation of the individual centres are purposive or expressional in character, and such as we should, from psychological analysis, attribute to ideation and volition if we saw them performed by others. The clutching or striking movement of a cat's paw is not a simple muscular contraction, but is a complex and combined action of numerous muscles, all directed to one end."* The general conclusions come to by Ferrier, from the experiments detailed in his paper in the West Riding Asylum reports, are probably known to most of our readers, as they were published in the *British Medical Journal* for April 26, 1873, and in the *Medical Record* a few days after. For our present purpose the first two of these conclusions are the most important. These are (slightly altered in the present paper) as follow:—

1. "The anterior portions of the cerebral hemispheres are the chief centres of voluntary motion and the active outward manifestation of intelligence.

2. The individual convolutions are separate and distinct centres; and in certain definite groups of convolutions (to some extent indicated by the researches of Fritsch and Hitzig) and in corresponding regions of non-convoluted brains, are localised the centres for the various movements of the eyelids, the face, the mouth [and tongue], the ear, the neck, the hand, foot, and tail. Striking differences corresponding with the habits of the animal are to be found in the differentiation of the centres. Thus the centres for the tail in dogs, the paw in cats, and the lips and mouth in rabbits, are highly differentiated and pronounced." (p. 94.)

Among the many important bearings which these results present, perhaps one of the most striking is with reference to the question suggested as to the relations of the cerebrum as the organ of intelligence and the seat of motor centres. How are we to account for the fact that these centres which are generally admitted to be the seat of the intellect, are now proved to be the "chief centres of voluntary motion"? It seems only possible to do so by drawing closer than is usually done the connection of intellect and its physical manifestations. In one of the articles mentioned in our heading,† Dr Hughlings Jackson enters in a very able manner into this subject, and

* Ferrier's paper in West Riding Asylum Reports. P. 73.

† Observations on the localisation of movements in the cerebral hemispheres. Paper in West Riding Asylum Reports.

in many parts of Herbert Spencer's Psychology we have similar illustrations. In the former article, the author endeavours to point out the close relation which exists between defect of articulation (a paralysis of motion) and defect of speech or aphasia, which may be considered a mental phenomenon—"a certain defect of articulation is a rudimentary defect of speech." It is not necessary to follow the author through the details of his argument. It will be enough to give a general sketch and refer the reader to the article itself, which is an exceedingly suggestive one. He considers that the centres for articulation are in the same (anatomical) series as the centres for language, and that though it may be possible in extreme cases to distinguish between, on the one hand, a paralysis of the muscles of articulation, and on the other, true aphasia or loss of memory for words, yet there are cases in which the line can by no means be strictly drawn. Thus in softening of a limited portion of the convolutions, there is commonly defect of speech, aphasia; while in cerebral hemorrhage, where the deeper portions of the motor tract are usually affected, there is more likely to be defect of articulation. The important point, however, is that the affected portions of the brain are anatomically related; they are near each other, and the same lesion may involve both. Then, again, language seems impossible without the outward movements, which express it. In remembering a word, it seems to be necessary to pronounce it—if not with the actual muscles of articulation, yet with an ideal movement of these muscles, which in many persons resolves itself into an actual involuntary movement of the lips. As if in the very conception of a word the excitation of the centres of articulation were involved; and though this excitation is generally only slight, there are persons in whom it is great enough to produce the corresponding movement—such persons having the habit of talking to themselves, or, as it is called, "thinking aloud." The experience of deaf-mutes is adduced in confirmation of this view. It appears that they are not able to think without the ideas being expressed in finger language. "Laura Bridgeman, when she dreamed, 'talked to herself in finger language;' and Whately, speaking of this deaf mute, says:—'The remarkable circumstance in reference to the present subject is that, when she is alone, her *fingers are generally observed to be moving*, though the signs are so slight and imperfect that others cannot make out what she is thinking of. But if they inquire of her she will tell them.'" It seems, therefore, that both in those who use articulate speech and the language of signs, the idea of words is

accompanied by a faint excitation of the motor centres involved in their expression, and that this faint excitation is often sufficient to produce slight movements of the parts concerned. These observations are wonderfully confirmed by the experiments of Ferrier. He found "that the centres for the mouth and tongue in cats and dogs are localised in regions corresponding in geographical position, and which, both anatomically and physiologically, I should be inclined to regard as homologues of the lower frontal and Island of Reil in man;" so that the grey matter on the surface of these convolutions, which is generally the seat of disease in aphasia, seems at once to be the seat of the memory of words, and to contain centres for the movements of articulation.

Although, therefore, the details are by no means fully made out, yet we are led to the very significant conclusion that the grey matter on the surface of the convolutions, contains not only the centres which are concerned with intelligence, but that it contains also distinct automatic centres for the expression of intelligence. And it will be observed that these conclusions are completely in harmony with the view of the nervous system given by Herbert Spencer, and sketched at the outset of this review. If the convolutions of the cerebrum are simply as Hughlings Jackson expresses it, the middle ganglia "raised to a higher power,"* then they must, as it were, gather up in themselves the various motor fibres of these lower centres, combining them into new groups according to the wants of the more highly evolved intelligence. It will indeed to most of us be a new and striking idea, that all those multiform and complicated movements which we call voluntary have each of them an automatic centre in the cerebral hemispheres, and yet this seems to be the conclusion towards which these facts are driving us. One can imagine the surface of the hemispheres as dotted over by the innumerable keys of an instrument, and that as each key is touched, and without any further active interference, a complicated system of machinery is set in motion, which leads to a set of movements of the greatest complexity. We can conceive how the innumerable keys of this instrument are successively touched by an invisible power, and how the whole complex and diversified series of thought and action have thus their correlatives in changes in the nervous system. To this conclusion the facts seem to drive us, but the great and most difficult problem still lies beyond. How are these keys played on? What power is it which uses this complicated organism?

* *Brit. Med. Jour.*, May 10, 1873.

It seems that we are able to produce these movements automatically by stimulation of the centres; but what is it which in the living and active man produces the conscious and voluntary excitation of them. All that these observations seems to show is, that the nervous system is an instrument of vastly higher mechanism than we had ever imagined, that it is constructed on such a principle as to give every facility for the expression of thought in action, that it is thus calculated in a higher degree to save labour in the expression of volition. But so far as we can see it brings us no nearer to the question as to the ultimate origin and cause of voluntary action, and takes us not a step nearer the much-dreaded pit of materialism. Granted that, along with a high intellectual development, there is a high differentiation of the nervous centres, yet this does not resolve voluntary action into the automatic function of these centres. It only shows that in order to the highest development of mind it is necessary to have an instrument of corresponding complexity and diversity, and this is merely what on general considerations we would be led to expect.

It is now time to turn to the effect which the ideas involved has had on the pathology of the nervous system. We owe to Dr Hughlings Jackson the development of this department, and to his writings we shall have to refer in most of what follows. We can only say at the outset that this author almost alone seems to have anticipated, from clinical and pathological observations, the results which physiology has so amply confirmed. Dr Jackson is in the habit in most of his numerous writings of insisting on the rigid separation of the two kinds of disturbance of function in the nervous centres, which he respectively denominates, "destroying lesions" and "discharging lesions." In a case belonging to the former class the part is virtually lost to the system, its function is abolished. In cases which come under the latter designation the centres are over-active, their function is increased, and the actions which are the result of their excitation are done too frequently, or too violently, or it may be in an irregular manner. It is easy enough to understand what is meant by a "destroying lesion"—any affection, such as a clot of blood, which puts a portion of nervous tissue out of action is a "destroying lesion"—but the other expression may need a certain amount of explanation. In a discharging lesion, such as we have in chorea and convulsions, the grey matter of certain parts of the nervous system is in an abnormally unstable state. Whatever be the exact nature of the change by which nervous centres influence the nerves and through them the muscles, that change occurs

in an irregular or excessive manner. This change may be termed a discharge of grey matter, and the grey matter thus prone to discharge is said to be unstable. Where the discharge is violent and sudden, we may speak of the grey matter as in an *explosive* condition. These expressions are all more or less theoretical, but they render in a proximate sense the actual nature of the changes; and, now, when a convulsion takes place, it is caused by the grey matter concerned discharging violently. In this view it is very important to study those cases in which spasms or convulsions are localized, where, as in some cases published by Hughlings Jackson, there is, for instance, spasm of the thumb and index finger. Such cases are a kind of pathological experiment performed for us in the human subject. For, if in a case of such partial convulsion, we find in the brain (as he has found in some cases) disease limited to a distinct convulsion, then the importance of such observations for the localization of the motor centres can hardly be over-estimated.

It seems likely that the localization of the centres of voluntary motion in the grey matter of the convolutions can only be determined by such experiments as those of Ferrier, and those performed for us on the human subjects by discharging lesions of these centres. Destroying lesions of these centres can give us little information, for as it has been long known, loss of limited portions of the substance of the convolutions leads commonly to no very definite symptoms. The patient "can do without" considerable portions of the convolutions, and it is only by the abnormal excitation of these centres that we can recognize their functions. How it is that a destroying lesion of a limited portion of the convolutions should produce no symptoms while a discharging lesion does, will be readily understood from what has gone before. The centres in the convolutions are not the centres of particular muscles or of groups of muscles, they are the centres of certain voluntary *movements*, involving in many cases almost the entire muscles of the body. The same muscle may be represented in a thousand such centres, and the destruction of nearly the whole of them would probably not produce complete paralysis of the muscle. All that ought to ensue from the destruction of such a centre is the loss of certain voluntary movements, and this certainly does not amount to paralysis. Besides, destruction of the centre for particular movements in one cerebral hemisphere does not imply that the entire centres for these movements have been destroyed—they may be represented in the other hemisphere. Ferrier enters somewhat extensively into this subject, and adduces a number of experiments, which seems to him to prove that there does

exist "a *physiological* bilateral co-ordination,—at least as far as the highest centres are concerned." It is also to be noted that the mere absence of certain voluntary movements (as distinguished from the absence of voluntary motion in a limb) might completely escape detection. Taking the instance given in an early part of this paper, it seems that there is a centre in the cat's cerebrum whose irritation causes the animal to strike or clutch with its paw. But supposing that this centre were destroyed, the mere fact that the animal did not strike or clutch at anything might never be noticed, and inasmuch as for other actions the paw would be as vigorous as ever, the condition could never be called paralysis. But the case is very different when we come to the case of a discharging lesion of any of these centres. In such case the muscles represented in the affected centre would be spasmodically contracted, the voluntary act would be done it may be in an irregular and unusual manner. It must be rare indeed that a pathological process will localize itself so as to affect one particular centre, and leave the neighbouring one untouched; but there seem to be undoubtedly cases in which there is at least a proximate localization, and in such cases where the spasm or convulsion is confined to some particular set of movements, the seat of the process must be sought with the greatest solicitation.

The importance of this entire set of observations in the study of convulsions, and especially of epilepsy, can hardly be estimated. In epilepsy we have a discharging lesion, the discharge, however, does not confine itself to certain localized centres, but generally extends to a large number of centres, and usually involves loss of consciousness. Ferrier was able to produce epileptic convulsions in animals, and in the *résumé* already referred to, the following was his fourth conclusion—

"4. The proximate causes of the different epilepsies, are, as Dr Hughlings Jackson supposes, 'discharging lesions' of the different centres in the cerebral hemispheres. The affection may be limited artificially to one muscle, or group of muscles, or may be made to involve all the muscles represented in the cerebral hemispheres, with foaming at the mouth, biting of the tongue, and loss of consciousness. When induced artificially in animals, the affection, as a rule, first invades the muscles most in voluntary use, in striking harmony with the clinical observations of Dr Hughlings Jackson."

That this view of epilepsy is very different from the prevalent one, none will deny. In Reynold's System of Medicine there is an article on epilepsy by the editor, which follows that by Hughlings Jackson on convulsions. Under the section Patho-

logy occurs the following—"The seat of the primary derangement is the medulla oblongata, upper part of the spinal cord, and vaso-motor system of nerves."* In the same volume, at pp. 280 and 281, Hughlings Jackson asserts that convulsions are due to discharging lesions of the convolutions, and it must be remembered that this was written in 1872, a year before the publication of Ferrier's results. According to Hughlings Jackson "*Epilepsy is the name for occasional, sudden, excessive, rapid, and local discharges of grey matter.*"† The epileptic attack is due to a local discharge of grey matter, and in respect to their localisation epilepsies differ. In some cases the spasm begins in the hand, and may remain there or spread over the whole body, attended, it may be, after a certain stage, by loss of consciousness. But, in other cases, loss of consciousness occurs at the very outset, and we must conceive that in these cases the locality of the discharge is different. At the same time it is to be noticed that an epilepsy commencing in a particular part may spread to others, and in all probability the arteries and their vaso-motor nerves have to do with this spreading. For the purposes of localisation, then, it is important to notice the original locality of the spasm, as well as its subsequent march.

It may here be proper to make one or two observations as to the causes of "discharging lesions." If we consider the nature of these lesions, it must be evident that the exact anatomical change will be very difficult of detection. The mere fact that the function of the grey matter is carried on, although in a disorderly manner, shows that there cannot be any *great* alteration of structure. Were the structure much altered the function would probably be destroyed, here it is even exalted. There are cases of convulsions, however, in which we do meet with a coarse lesion in the brain, as, for instance, a tumour. Of course, the excessive discharge is not from the tumour, but from the irritation of the grey matter in its neighbourhood. The tumour may destroy a portion of grey matter, but it is not this "destroying lesion" which produces the symptoms, rather it is a "discharging lesion" in the neighbouring grey matter. We may therefore have convulsions resulting from such gross lesions of the centres, and where the lesion is limited, and where the spasm is also limited, then we have a case where study may lead to important data for the localisation of movements. Again, we may have general convulsions produced by extensive destruction of the centres, as by hæmorrhage, the convulsions being produced by the irritation at the time of destruction, the destruction leading to subsequent

* Reynold's System of Medicine, 2nd ed. 1872. Vol. II. p. 317.

† From his 2d paper in West Riding Asylum Reports, p. 331.

paralysis, or not, as the case may be. In the class of cases to which properly the name epilepsy is given, we must first make out the absence of such gross causes of convulsions. After the elimination of all such causes we can say that the patient has had an epileptic fit, and may expect that he will have a recurrence, although such is not always the case. In cases of true epilepsy then, the pathological nature of the lesion has not as yet been discovered, though from what we already know as to the localisation of movements it may be possible to discover its seat. From what has been already remarked, it can produce no astonishment that the anatomical change has eluded observation, and it is possible that it may continue undiscoverable, being rather a minutely chemical or functional, than a morphological alteration.

It may be convenient to close this review with a therapeutic observation. Dr Crichton Browne, the editor of the West Riding Asylum Reports, has used the nitrite of amyl in certain cases of epilepsy, and apparently with good results. He has been led to this mode of treatment by the observation that in cases of epilepsy in which the attacks begin with loss of consciousness, there is contraction of the vessels of the face, evidenced by extreme palor. This seems coincident with a spasmodic contraction of the arteries of the brain, the convulsion being a consequence of the resulting anæmia. Now, it is well known that nitrite of amyl has a wonderful power of relaxing the muscular coat of the blood-vessels, "and it seemed that if the nitrite of amyl could be given as an inhalation immediately before the fit, the spasm of the vessels might be prevented, and so the whole sequence of morbid events averted." (p. 159). In asylum practice the fits generally come on without warning, there is seldom an *aura*, the cases being in an advanced stage, but the author administered the agent several times daily to cases where the fits were frequent, and found immediate benefit. Even in advanced cases in which the *status epilepticus* is developed, he found benefit in 8 out of 10 cases; and he suggests that in an early stage, if patients were to carry a vinaigrette containing a sponge with a few drops of nitrite of amyl, they might be able to avert the fit on the first appearance of the aura. It is also interesting to observe that in rabbits in which artificial epilepsy was produced by Ferrier, the inhalation of nitrite of amyl prevented the development of the fit.

II.—A TREATISE ON MEDICAL ELECTRICITY AND ITS USE IN THE TREATMENT OF PARALYSIS, NEURALGIA, AND OTHER DISEASES. *By JULIUS ALTHAUS, M.D. Third edition enlarged and revised.* London: Longmans, Green & Co.

WE regret that by an accident (for which we beg leave to apologise) the second edition of this work (1870) was not reviewed in these pages. We have reason to believe, however, that this omission did not prevent the work from gaining favour among many of our readers, and the rapid appearance of a fresh edition testifies to the wide appreciation which its predecessor so deservedly attained.

The external appearance of the present edition is a great improvement on that of the previous one, and we are glad to be able to report that the internal improvement is no less striking. Considerable additions and alterations are made throughout, and various points are discussed at length for the first time.

The description of electrical instruments is enriched by the addition of recent apparatus; a favourable report for example, is given of Leclanché's battery, at least for such applications as do not require prolonged sittings. Of portable batteries for the continuous current Stöhrer's and Foveaux's (Weiss and Son) instruments are chiefly recommended; but, like most of those who have used electricity very extensively, Dr Althaus prefers a Daniell's battery, using that modification of it which is known here as *Becker-Muirhead's*. This preference is founded on the greater *constancy* of the current from such a battery. He also says—"The current produced by the portable batteries is more painful than that produced by the large stationary battery

. . . the power of decomposing water and the magnetic properties of the two currents may be the same, and yet there is a difference in their physiological and therapeutical action. The same electro-motive force which in a portable battery is crammed into a square inch has perhaps 10 or 20 square inches to spread over in the large battery. . . . As practitioners, we have simply to register the fact that the large stationary Becker-Muirhead is better than all the portable batteries which have been constructed" (p. 319). This opinion is also held by MM. Onimus and Le Gros, whose work we reviewed in August, 1872. As questions are often put regarding the real utility of Pulvermacher's chains as a means of obtaining the benefits of the continuous current, we quote the opinion of the author on this subject—"The chains are portable, handy, and easily put in action; but they have the drawback inherent to all modifications of the original pile, viz., that the current generated by them is

liable to great and sudden variations within a short time. Moreover, in consequence of their small surface, and high tension, they are not suitable for being applied to the nervous centres. A prolonged use of the chains, which is generally recommended, is not only opposed to all principles of physiology and therapeutics, but also condemned by daily experience; as, when thus employed, they cause sloughs, the cicatrices of which remain throughout life, and may aggravate the disorder for the relief of which they were brought into play" (p. 287).

A valuable improvement introduced in this edition consists in the more minute directions, illustrated by woodcuts, regarding the exact places on which the sponges or poles of the battery should be placed for calling into action special muscles or certain groups of muscles. It is too common even now (amongst those medical men who are but little acquainted with electrical treatment) to ignore the existence of *localised* electrification, or to have such difficulties in its practical application as never efficiently to carry it out. These woodcuts will materially aid all such persons.

Dr Althaus refers to Messrs Beard and Rockwell's system of generalised faradisation, but, without denying any possible benefit from such a method, he evidently regards it with but little favour.

The author refers to M. Cyon's objections urged against galvanising the brain, to which we referred in a review of his work a few months ago (May, 1873). Dr Althaus alleges that although the physiologist may have great difficulty in localising lesions in the brain, the physician experienced in nervous cases can usually make up his mind without much serious doubt; and further—"provided a gentle current be used for a short time, the flow of it through the healthy portions of the brain does not do any harm, while it may do a great deal of good to those diseased parts, the nutrition of which requires a stimulant. In the same way, a dose of ammonia and brandy taken by a healthy man will not influence his condition perceptibly, while it may save the life of a patient sinking from collapse" (p. 332). The author likewise quotes M. Cyon's experiments on the human subject as adding confirmation to the doctrine of Anelectrotonus and Catelectrotonus, which he also evidently regards as supplying the sure foundation of electro-therapeutics.

The multiplication of specialties has been often deplored in medicine; but it may be mentioned as a compensation in part for this evil that one specialism may cure the evils inflicted by another! "There is one form of paralysis of the portio dura which has only quite recently sprung into existence, and which, for want of a better term, I propose

calling *aural surgeon's facial paralysis*. It is produced by the reprehensible practice of injecting a caustic solution of nitrate of silver (from 40 to 60 grains in the ounce) into the external meatus, for the relief of deafness arising from aural catarrh. The deafness is not relieved; and another very troublesome and annoying affection—paralysis of the portio dura from injury in the fallopian canal—added to the one previously existing. . . It is fortunate for these poor patients that the physician's skill may remedy the harm done by the surgeon's recklessness. The constant current employed regularly for two or three months entirely cures *'aural surgeon's facial paralysis'* (p. 562).

General surgeons, as well as aurists, may learn something from this treatise, as the various forms of apparatus for the galvano-cautery are described at length, and the treatment of tumours by electrolysis, and of aneurisms by galvano-puncture, are dealt with much more fully than in the previous editions. It seems to us as if surgeons were negligently indifferent to the value of galvanic apparatus in the treatment of their cases. The remarkable lectures recently delivered by Mr Holmes on the treatment of aneurism, and the great value which he is evidently inclined to accord to this method may perhaps awaken some interest amongst surgeons on this subject. Meanwhile, physicians have been cautiously trying galvano-puncture in such aneurismal tumours as are confessedly beyond the reach of the usual surgical methods. And in the Royal Infirmary, here, there has been one of the most successful cases of this kind yet reported. The author records at length the method pursued by Dr M'Call Anderson in the treatment of this case, which differed from that recommended by Dr Althaus in that only one insulated needle (positive pole) was inserted into the aneurism, the circuit being joined by a metallic plate and wet sponge applied externally. Dr Althaus recommends needles connected with both poles to be introduced into the sac. We think, too, that surgeons would do well to consider the remarks and cases cited by Dr Althaus regarding chloroform asphyxia and its treatment by faradisation of the phrenic nerves. We have witnessed the success of this treatment when life seemed beyond hope; and we are convinced that the success in this and other similar cases depended on the instrument being quite ready for application, and that the failure of this remedy for such accidents may usually be ascribed to the delay incident to the fetching of a battery.

We can recommend this work very confidently to our readers as containing, in one volume, all that is of most importance regarding the various forms of electricity, and the different kinds of batteries and other apparatus required for medical and surgical work. The physiological part is dealt with at sufficient length, and the various chapters and sections on the different forms of disease in which electrical treatment has been recommended or found useful, supply ample information as to the different methods pursued by different authorities in the treatment of the obstinate affections which are usually relegated to the electrician. That this remedy can reach disorders which are otherwise beyond our control seems now to be admitted by all who have given any serious attention to the question. The trouble and expense of the treatment constitute such a serious objection to its general adoption that we need not wonder that it is usually only the worst cases which come under its influence, so that the degree of success it has already attained entitles it to rank very high in the realm of therapeutics.

III.—LECTURES ON BRIGHT'S DISEASE, with especial reference to Pathology, Diagnosis, and Treatment. By GEO. JOHNSON, M.D., F.R.S. London: Smith, Elder & Co. 1873. pp. 152.

THESE lectures of Dr Johnson, which are reprinted from the *British Medical Journal*, are intended especially, as he states in the preface, for medical practitioners and students, and he ostensibly avoids in them "the doubtful and disputed questions relating to the minute anatomy and pathology of renal disease." So far as the book is a practical guide to the clinical observation and treatment of Bright's Disease, it seems to us to be admirable in its style and arrangement.

To certain statements of Dr Johnson as to anatomy and pathology, we feel compelled, however, to take exception. In the first place, it is one of the great points with the author that there is no connective tissue in the cortical portion of the kidney. The object of this statement in respect to the minute anatomy of the normal kidney comes out when he treats of the pathology of Bright's Disease. It is well known that Dr Johnson considers Bright's Disease to be essentially an intratubular affection, the epithelia of the tubules being alone affected in the first instance. If, therefore, people could be got to believe that there is no such thing as a connective

tissue between the tubules; then, of course, the idea of an inflammation of that interstitial tissue could not be entertained. To prove that this is the case, Dr Johnson gives a woodcut and a quotation. The woodcut represents a transverse section of the cortical portion of the kidney, from which the epithelium has been removed by washing, and is intended to show that there is no such thing as any connective tissue between the tubules, all that is left being basement membrane and blood-vessels. The sentence which he quotes from Ludwig's article in *Stricker's Manual of Histology* is rather an unfortunate one, because it lays Dr Johnson open to the charge of taking what it suits him from this article and leaving what does not; in fact, reminds one of the graphic words of Burns as to the use occasionally made of Scripture. For, though Ludwig does say at one part that "no *fibrillated* connective tissue exists between the tortuous portions of the urinary tubules," and this is all the author quotes; yet, in the very first sentence of the paragraph from which this quotation is taken, it is stated that "the labyrinth of the cortex, and the limiting layer of the medulla chiefly consist of the cellular form of this (connective) tissue," and there is in the paragraph rather a minute description of the connective tissue of the cortical portion of the kidney. It is also worthy of notice that the author repeats the quotation from Ludwig at p. 57.

Again, in treating of the diseases of the kidney, Dr Johnson throughout ignores the presence of any new-formed tissue *between* the tubules, and blames "Virchow and his followers" for mistaking "thickening and corrugation of the membranous walls of the tubes" "for a formation of connective tissue *between* the tubes." Now, we can understand an author holding that in Bright's Disease the affection is always primarily an intratubular one, that the epithelium is always, in the first instance, the structure affected. But in the face of the numerous observations of such men as Virchow, Klebs, Förster, Rosenstein, Rindfleisch, Beer, Stewart, &c., it seems strange to ignore the presence of any affection of the interstitial tissue. Let it be granted that the disease is primarily intratubular, still we cannot understand how any one who has examined many kidneys can deny that, at least in some cases, and at some stages, there is a large intratubular formation. In Rindfleisch's *Manual of Histology*, recently translated and published by the Sydenham Society (vol. II., p. 151), there is a woodcut, whose truth to nature we have many times had the opportunity of confirming; and how, after the observation of such cases Dr Johnson can quietly ignore the facts, it seems difficult to conceive.

We have thought it right to refer to these matters, because the author of this work seems to make a very essential point of them. In the present volume, however, they do not perhaps bulk so largely as to be very obnoxious; and, otherwise, the work is a very valuable practical hand-book—especially in the matter of treatment are the directions given both rational and practical. This portion of the treatise we would heartily recommend to the careful perusal of all medical practitioners.

IV.—THE ANATOMIST'S VADEMECUM, A SYSTEM OF HUMAN ANATOMY. *By* ERASMUS WILSON, F.R.S. Edited by George Buchanan, A.M., M.D., Professor of Anatomy in Anderson's University, Glasgow, assisted by Henry E. Clark, M.R.C.S. London: Churchill. 1873.

THIS text-book, from its shortness, freedom from unnecessary detail, and the many helps to memory with which it abounds, has always been a favourite with students. Nor will this ninth edition detract from the esteem in which it has hitherto been held. After a most painstaking examination, we can cordially recommend it as a book more than ever suitable for junior students, and, indeed, for all who wish to have the elements of anatomy put before them clearly, accurately, and in the fewest possible words. While the arrangement of its predecessors has been generally followed, much has been re-written, and the results of modern investigation inserted wherever necessary, so that, in the words of the preface, "the information has been brought up to the present day." Most care, naturally, has been expended on the minute anatomy of the textures, and the work in this department has been exceedingly well done. We would especially notice the admirable chapters on the teeth and the organs of the senses, where all that is actually required to be known is given in short space and with plenty of illustrations. Indeed, the drawings throughout the book are a vast improvement upon those of former editions. Many old woodcuts have been replaced by newer and better ones, as for instance those on the nerves are copies from Hirschfeld and Leveillé's work; Kölliker, Quain and others have likewise been laid under contribution. But in addition to these about 50 new drawings have been inserted, executed by the accomplished hand of Mr Tennent, of Glasgow.

The changes introduced have mostly been for the better, and that is saying a good deal for the *ninth* edition of any book. In fact the only points to which we feel the slightest objection, are those which their own scruples have caused the editors to leave

alone; a few of these blemishes, we would take the liberty of pointing out for the benefit of a *tenth* edition.

In the general description of muscular tissue we find several times over the names "ultimate fibres of animal life," and "ultimate fibres of organic life." Now, what can any student, however far advanced in his studies, understand by these remains of exploded theories? Who in these days of discovery dare pretend to have reached an ultimatum anywhere? For teaching purposes at least, surely the ordinary names of voluntary and involuntary muscular fibre are quite good enough. Again, in the description of the texture of the heart, we are left entirely in the dark as to whether its "ultimate fibres" belong to the "animal" or the "organic life," whether they are striated or plain, and as to how they are formed. Nor can we understand on whose authority the presence of ganglia on the cardiac nerves is so absolutely denied. A small slip occurs in the description of the Triceps brachii muscle. The external head does not arise "from the whole length of the external and posterior aspect of the humerus, and from the intermuscular septum as far as the *outer condyle*," but only as far as the musculo-spiral groove. The word triceps is curiously said to be derived from *τρις*—*κεφαλαί*, and biceps (pp. 254, 282) is still more curiously given from *bis*—*κεφαλαί*. What medical vocabulary is responsible?

The last chapter of the book seems to us to be decidedly faulty. It is an account of the anatomy of the foetus at the full period, embracing, however, the history of the development of certain tissues. But the statement is very meagre and incomplete. The development of the bones begins with the seventh week; the organs of the senses appear at an "early" period; the thymus gland also at the seventh week; the spleen "at the end of the seventh month in the foetal mesogastrium from the middle layer of the germinal membrane;" the supra-renal capsules at the second month; the Wolffian bodies about the fifth week. The remaining organs have no dates attached to them. A few details are then added in most cases, though not in all, but no attempt is made to connect the whole together by an account, however slight, of the development of the ovum, and the changes which take place in it. Consequently, many terms made use of throughout the book, like blastoderm, mesogastrium, parovarium, &c., are wholly without explanation.

Notwithstanding a few such blemishes as these, this edition of the Vademecum will amply sustain the fame of its predecessors, and, at the same time, extend the reputation of the school from which it now proceeds.

V.—THE HARVEIAN ORATION. 1873. By GEO. ROLLESTON, M.D., F.R.S.,
London : Macmillan & Co.

AMID the multitude of insipid "addresses" and colourless "orations" with which we are yearly deluged, it is refreshing to come across a production at once so classically learned and so original as the Harveian Oration of Professor Rolleston.

Being the annual oration delivered in honour of Harvey, it is quite natural that much space should be occupied with the discussion of some points in the history and work of the discoverer of the circulation of the blood. But this portion of the address is relieved from the tameness which, with most writers, would be inevitable, by the earnestness and vigour which the author has displayed in the search for the MS. of Walter Warner, and in the scholarly and complete manner in which he has disposed of that writer's claim to the discovery of the circulation.

We have been more deeply interested, however, in the author's anatomical and physiological observations, and of these we have a few words to say.

It will be remembered that in the heart of the sheep, rhinoceros, and certain other ungulates, the free and septal walls of the right ventricle are frequently united by a muscular band or transverse *columna carnea*, which has received the name of the "moderator band." Professor Rolleston had the good fortune to discover a like band in the heart of the Australian cassowary, and now points out its existence in a rudimentary form in the heart of man. Since the oration was delivered, additional evidence as to its existence in the human heart has been added by Mr Galton and Dr Greenhow, and we have no doubt that most anatomists can call to mind one or two such cases which have come under their own observation.

The truth is, that some connection between the free and attached wall is found in all mammals, but it is only occasionally that the connecting band becomes so large as to attract special attention, or deserve a special name. In the human heart we generally find a small band which proceeds from the base of the great *musculus papillaris* to join the ventricular septum. It varies from one to two inches in length, and, if prolonged beyond this, takes the form and position so accurately figured by Dr Rolleston in his engraving. As to the purpose served by this band, the author preserves a judicious silence, and so shall we.

We are pleased to see so complete a recognition of the work done by Dr Rutherford, especially at the present time, when many physiologists seem inclined to ignore the results achieved by British experimentalists, by which means Schiff receives the credit of discoveries as to the enervation of the heart, which were made by Rutherford.

Clinical Record.

I.—FATAL CASE OF CHRONIC MUCO-PURULENT TYMPANITIS (VEL OTITIS MEDIA PURULENTA), INFLAMMATION OF MASTOID CELLS OF BOTH TEMPORAL BONES, INVOLVING THEIR OSSEOUS STRUCTURE.

Reported by DR JAMES PATTERSON CASSELLS.

ON the 12th Feb., 1873, Dr Edward M'Millan, of this city, requested me to meet him in consultation on the case which is here briefly reported.

J. W., *act.* 12, at school till a few days ago; intelligent and active; delicate and pale, yet well developed, and has had upon the whole good health till now.

History.—About eight years ago caught a severe cold, followed by pains in head and ears. After some days there was a discharge of pus from the meatuses and relief. This discharge continued, more or less, for a considerable length of time, but has ceased for several months past. At first he had occasional slight pain in ears at long intervals, but does not now suffer from, nor has he lately complained of, this symptom.

His *hereditary history* is not perfectly satisfactory, for although no other member of the family has at any time suffered from symptoms similar to his, yet his father has a perforation of the membrana tympani of the right side, and other evidences of purulent inflammation of the tympanum, suggesting the possibility of a transmitted taint, or at least a pre-disposition to this form of ear disease.

Since coming under Dr M'Millan's care, J. W. has had frequent and apparently causeless vomiting; much nocturnal pain in head preventing sleep; double convergent strabismus; during the night, heat of skin and accelerated pulse, both of which, as well as the headache, are absent during the day. The tongue is natural, bowels constipated, and appetite capricious. Further, although his aspect is slightly vacant, he answers questions within his comprehension intelligently and coherently, and there is no delirium at night.

Patient's *present condition* is as follows:—In addition to the symptoms above mentioned, we find the external ear region normal in form, tempera-

ture, and sensation. *Steady* and *firm* pressure on any part of this space, including tragus, does not occasion pain. If, however, the mastoid region is *sharply and suddenly*, but not *violently*, concussed, a sensation of deep seated lancinating pain is occasioned. This persists for some time (5 or 10 minutes), and is similar to that from which he suffers at night. Both *meatuses* are filled with plugs of cerumen and epithelial debris, on removal of which we find in both ears evidence of long existing disease. The *right membrana tympani* has suffered an extensive destruction of its tissue in both posterior quadrants, and the edges of the perforation are cicatrised. The remaining portion of the membrane is thickened and opaque, the malleus being faintly visible through the sodden tissues. The lining membrane of the cavity of the tympanum, thus exposed, is red, deeply congested and moist. The *left membrana tympani* is more extensively destroyed, a narrow strip of its tissue at the periphery alone remaining. The handle of the malleus, denuded of its covering, and deprived of its support, projects into the tympanic cavity, whither it is drawn by the tensor tympani muscle; the lining membrane of this cavity is yellowish grey in colour, and moistened by purulent secretion. The meatuses are congested at their inner third and highly sensitive.

The *naso-pharynx* is congested, relaxed, and slightly granular. *Eustachian tubes* both open, but affected by chronic mucous katarrh derived from the naso-pharyngeal cavity. Further examination of the case showed that the *auditory nerve* was in a normal state. The *hearing distance* was for each ear—mono-syllables spoken in a moderate tone—6' for the watch—(capable of being heard by a healthy ear at 15')—this case gave on $\frac{R}{L} \frac{6''}{2''}$ as its limit. There were no signs of pent-up discharge, and no polypi in either ear.

Diagnosis.—After removal of the accumulations from the meatuses, and it became possible to investigate the condition of the ears, the real nature of the case was recognised without difficulty. The morbid changes there observed, together with the unmistakeable symptoms of cerebral mischief, left us in no doubt that we had to deal with a meningeal affection arising out of the ear disease; the latter having probably caused caries of the osseous tissue of the tympanic walls or mastoid cells;—a case of muco-tympanitis with probable caries, and secondary meningitis.

The *prognosis* was decidedly unfavourable, yet not without a hope that the treatment, which had for its object the arrestment of the morbid process, might for a time at least avert the issue which the grave character of the symptoms caused us to fear.

The *treatment* was as follows:—Local depletion over mastoid processes, free, but not excessive purgation, the administration of alterative mercurials and full doses of an opiate at bed time, or oftener if necessary, in order to procure relief from the nocturnal pain, and if possible sleep. Frequent politizerising was recommended, and the use of the nasal douche. Careful dieting and mental and physical rest were enjoined.

For three days after this treatment was begun there appeared to be a considerable improvement in our patient's condition; there was much less irritability of stomach, and the headache, though not quite gone, was less intense, but never absent; the hearing power also had considerably increased.

This improvement, however, was of brief duration. The pain in the head recurred with its former violence, lasting each day about ten hours, from 8 p.m. till 6 a.m., from which time till evening of the same day he had freedom from this distressing symptom.

From this time till his death, (ten weeks afterwards), he was partly confined to his bed, and at times able to move about his room. He had now in succession, double vision, blindness, strabismus, deafness; Bell's paralysis; loss of memory, of taste and of speech; severe pains in the lower extremities, and inability to walk, apparently from paralysis of those limbs; lastly, a semi-comatose condition, in which he lay for several days conscious to painful impressions, but out of which state he was roused with great difficulty. From this helpless and well-nigh hopeless condition he awakened, steadily regained his lost powers and faculties, became cheerful, and took a slight degree of interest in many little things that attracted his attention, improving at the sametime in his general appearance.

The treatment which had been for some time suspended, except the occasional opiate, was now resumed with such modifications as the changed circumstances of the case demanded; the kidneys were stimulated to increased action, and full doses of the iodide of potassium administered.

The almost total absence of the nocturnal pain, and the lessened irritability of stomach, together with the improvement in his general condition, which indicated a gradual absorption of the effusion, renewed our hopes for a time.

This improvement in the patient's condition only lasted six days, after which interval he began to relapse, all the old symptoms steadily returning, the nerves of special sense becoming affected as before, violent nocturnal headache, and furious delirium adding to his distress. On the 14th April, when last seen by me, he was unable to stand or walk, apparently from general paralysis of voluntary muscles, and was roused with difficulty from a semi-dormant state, from which he seldom voluntarily wakened. The sensation of the surface of the body at this time seemed to be normal. Between this date and his death his parents reported that he had ejected a large quantity of fluid by the mouth of a purulent character, a similar kind of fluid coming from his right ear about the same time. On the date last mentioned, I satisfied myself that there was no material change in the condition of the ears from that first observed and recorded above.

After this, Dr M'Millan, who continued to watch the case, reported that the patient gradually sank, became more helpless, and died, after a severe attack of convulsions, at 7 A.M. on the 28th April, 1873.

Sectio cadav. 34 hours after—present and assisting, Drs M'Millan and Rodman.

On removing the calvarium all the meningeal vessels are seen distended with dark coloured blood, the membranes themselves covering the convexity of the brain appear normal. On removing the brain, which presents nothing worthy of remark, about six ounces of a clear serous fluid is found effused at the base of the skull, at which place the membranes are highly congested. The dura mater covering that part of each petrous-bone corresponding to the roof of the mastoid cells and tympanum is thickened, presents inflammatory patches, and is easily detached from the bone; examined on its interior aspect it is rough at the parts corresponding to the eroded and discoloured bone. Removal of the roof of mastoid cells and tympanum on the left side, discloses the former partly filled with curdy yellowish pus, and the septa softened and easily broken down; while the walls, especially that part of them forming the roof, are inflamed and softened, one part being carious, this latter corresponding with the diseased portion of the dura mater. The tympanum is almost filled up by hypertrophy of its lining membrane, and the entrance to the mastoid cells nearly obliterated from the same cause. The head of the malleus is eroded, and numerous membranous bands bind the ossicles to each other, and to the tympanic walls. The condition of the left membrana tympani corresponds with the description given of its condition as observed during life. It was not considered necessary to examine the tissue of the brain, or the condition of the other organs or structures, because, in verifying the diagnosis, a sufficient explanation had been found for the varying character of the symptoms, and the chronic course of this, in some respects, remarkable case.

Remarks.—This case is an example of the advanced form of disease of the tympanic cavity, concerning which we have written in previous numbers of this *Journal*. It is possessed of considerable interest, on account of the remarkable and varying character of the symptoms which at one period awakened a hope of the patient's recovery, notwithstanding the very unfavourable prognosis formed at its outset. Its interest is still further enhanced to the general practitioner of medicine, because, in our experience, it is typical of a class of cases which are of far more frequent occurrence than is commonly supposed. That the fatal termination was primarily due to the chronic ear disease does not admit of doubt, and it is equally unquestionable that had this disease, at its first appearance in early childhood, received the treatment which was recommended for such cases in a previous communication, the serious pathological changes which the *post-mortem* examination revealed would have been prevented, and the life of the patient saved.

Exchange Journals.

*By Dr JOSEPH COATS, Lecturer on Pathology in Glasgow University, and
Pathologist to Glasgow Royal Infirmary.*

STRICKER'S MEDIZINISCHE JAHRBÜCHER.

PART IV., 1872.

CONTENTS.—I. Studies on bone and cartilage, by C. Heitzmann. II. Investigations on the action of nicotin, by Dr S. v. Basch and Dr L. Oser. III. Investigations and Observations on the death of the muscles, and on apparent death (Scheintod), by Dr M. Rosenthal. IV. Contribution to the question of mycosis of the lungs, by Dr. J. Popoff. V. Communications from the pharmacological institute of the University of Vienna, by Dr. C. v. Schroff, junr.

I. Inflammation of Bone and Cartilage (*Heitzmann*).—In this paper the author first gives a description of the histological characters of bone and cartilage respectively, and then proceeds to the discussion of their changes in inflammation. Perhaps the most remarkable point in the description of the normal structure of these tissues, is the statement, that the cells of hyaline cartilage are provided with radiating processes, which form a delicate varicose network in the matrix. This conclusion he has arrived at chiefly on the ground of examination of specimens coloured with silver and gold solutions. He finds that in inflammation there is very distinct alteration both of the bone and cartilage cells. In bone the lime salts are rapidly dissolved from the matrix, and the cells enlarge at its expense. The author has observed and figured in this paper what he considers to be the formation of blood-corpuscles within the bone cells of inflamed bone. He considers that the bone cells are concerned in the new-formation of blood-vessels, and that those involved in the process form blood-corpuscles in their substance. It may be remembered that Stricker has asserted the existence of a similar process in the inflamed cornea (See this *Journal* for Nov. 1871, p. 126).

II. Action of Nicotin (*Basch and Oser*).—In this paper which is founded on experiments on animals, the results produced by nicotin on the intestinal canal on the one hand, and the heart and blood-vessel on the other, are given. In respect to the latter of these, the author takes the observations of Traube as his starting point, and his experiments are generally confirmatory of the views of that author. As to the influence of nicotin on the intestine, it was found that in from 5 to 8 seconds after the injection of this substance into the jugular vein, there is violent tetanic (not peristaltic) contraction of the gut; which was occasionally preceded by a feeble peristaltic movement. Following the tetanic contractions, there is a period of 4 to 7 minutes in which the intestines are at rest; this again is succeeded by a stage of peristaltic motion, which is at first weak but becomes very energetic, and then dies away. The experiments seemed to prove that the nicotin produced these contractions, by direct action on the wall of the intestine. Thus the division of the vago-sympathetic nerve by which presumably the intestines communicate with the nerve centres, did not prevent these actions. Further, the injection of nicotin directly into the mesenteric artery produced the contractions of the intestine. Again, when, with the injection of

nicotin into the jugular vein, a branch of a mesenteric artery is obstructed, no action takes place in the portion of gut supplied, but the action occurs when the obstruction is removed. It seems, however, that nicotin may produce movements in the intestine through irritation of the nervous centres. When the aorta was obstructed and nicotin injected into the carotids, there was, after 3 to 4 seconds, slight but distinct peristaltic action. It is just possible that the slight peristaltic action which precedes the tetanic contraction after nicotin is injected into the jugular vein, may be due to this central irritation.

Death of Muscle and Hysterical "Apparent Death" (*Rosenthal*).—

The author has examined a considerable number of dead bodies by electropuncture and otherwise, in order to determine the period of disappearance of the muscular contractility after death. As might be expected, the muscles do not lose their contractility immediately on the cessation of respiration, but retain it, according to the present author, from $1\frac{1}{2}$ to 3 hours. He found that the irritability of the nerves disappears much before that of the muscles, that is to say, direct stimulation of the muscles produces contraction long after irritation of the nerves has ceased to do so. It is remarked that among the muscles, the sphincter palpebrarum retains its contractility longest. The author confirms these views by experiments on animals. He produced muscular rigidity artificially by stopping the circulation in the legs; and found that muscular contractility was gone after about two hours. The contractility was gradually recovered when the circulation was allowed to resume its course. The various means of determining the occurrence of death are discussed by the author, and he comes to the conclusion that in doubtful cases, the surest means is by testing the muscular irritability by means of electric stimulation. He details a very interesting case of hysterical "apparent death," in which preparations were being made for the funeral, and these would probably have been completed, but for the strongly expressed opinion of the author. A young woman, after violent emotional disturbance, fell into an unconscious state, and was supposed to be dead; this opinion being concurred in by the medical attendant. The author saw her 30 hours after she had fallen into this state, and found the body cold, motionless, pulseless; when the arms were raised they fell heavily like those of a dead body. A very faint and doubtful sound was heard in the cardiac region, but no movement of the chest or respiratory murmur could be detected. A slight movement of the abdomen however was observed. The author found that the muscles reacted to Faradisation, and as this was now 30 hours after the supposed occurrence of death, he gave it strongly as his opinion that death was only apparent. He recommended the application of friction, heat, &c., and the administration of coffee. He learnt afterwards that the patient spontaneously awoke from her state of lethargy in about 44 hours. She stated afterwards that she had no recollection of the onset of the attack, but that, later on, she was conscious, and heard and understood what was going on, but was unable to speak or move. The condition here is compared with that of nightmare, in which in spite of some supposed impending calamity, no power of speech or motion is felt to be possessed. The author claims that in this case the use of Faradisation was the means of preventing premature burial.

PART I. 1873.

- CONTENTS.—I. On reflex movements of the uterus, by Dr W. Schlesinger.
II. Contributions to the impregnation and development of the ovum of the

rabbit, by Dr C. Weil. III. Investigations on the economy of heat in the heart and lungs, by Ed. Albert and S. Stricker. IV. On the physiological effects of iridectomy, by Dr S. Exner. V. Contributions to the pathology of the urinary organs, by Dr J. Englisch. VI. Studies on the inflammation of the frog's cornea, by R. von Pfungen. VII. On the relation of the action of the ventricle of the heart to the formation of the pulse-wave in the arteries, by Dr E. Kolisko. VIII. Contribution on the structure of the normal and inflamed pericardium of the Batrachians, by Dr S. H. Chapman. IX. Contributions to the structure of the epithelioma, by Prof. Bizzozero. X. On the changes in the muscular tissue, after division of nerves, by Prof. Bizzozero and C. Golgi. XI. Contributions to our knowledge of Neurin, by J. Mauthner.

I. Reflex Uterine Movements (*Schlesinger*).—This author, along with Oser, has already published an article in which on experimental grounds it is asserted that the circulation of dyspnoic blood produces contractions of the uterus. These contractions seemed to be produced in two ways, by the irritation of the centres in the encephalon by the de-oxygenated blood, and by the direct irritation of the uterus itself by the blood. In the present paper it is sought to be proved that contractions of the uterus may be brought about by a reflex irritation of these centres in the brain. The author experimented on young female rabbits which had not yet conceived, for he finds that in these the uterus much more readily reacts to stimulation. He found that the irritation of the central end of a spinal nerve which had been divided, produced general and energetic contractions of the uterus in 5-15 seconds. This action was not produced when the medulla oblongata had been previously divided, so that the centres concerned are not situated in the cord, but are in all probability those centres in the encephalon previously referred to.

V. Pathology of the Urinary Organs (*Englisch*).—The author in this paper relates several pathological conditions which he has found in the bladder and urethra, and illustrates his cases by some good woodcuts. He notices a cause of obstruction of the urethra in very young children, which appears to be more common than one would expect. In no less than 5 out of 70 cases of infants a few days old, he found on post-mortem examination, a closure of the mouth of the sinus pocularis (utricle—rudimentary uterus of the male). The mouth being closed, the sinus was distended with secretion and formed a more or less globular swelling which projected towards the rectum, and also produced a prominence in the prostatic portion of the urethra which partially obstructed the passage of urine. The obstruction is very rarely a permanent one, the sinus afterwards empties itself, the passage of the catheter being usually sufficient to squeeze out the contents through the slightly adherent edges of the mouth of the sac.

VII. Inflamed Pericardium of Batrachia (*Chapman*).—After describing and figuring the appearance of the endothelium of the normal pericardium of batrachians, the author describes the condition of matters after inflammation had been induced by opening the pericardium and touching with nitrate of silver. He found that the endothelium-cells swell, and afterwards disappear, being apparently altered in the direction of pus or inflammatory cells. He found numerous cells with large nuclei like those of endothelium, but altered in shape, and possessing processes. The nuclei were also in the process of division.

IX. Peculiar Change in Muscle after Division of Nerves (*Bizzozero and Golgi*).—These authors were engaged in experiments, having a different

object when they lighted on the curious observation given in this paper. In some cases where the nerve supplying a muscle had been cut, they found that the muscular fibre had nearly or completely disappeared, while the muscle, as a whole, was even increased in size. The proper muscular tissue had been replaced by fatty tissue. This observation may be of some consequence in relation to paralysis pseudo-hypertrophica.

VIRCHOW'S ARCHIV.

VOL. LVII., PARTS III. AND IV., JUNE, 1878.

CONTENTS.—XVIII. Three cases of primary sarcoma of the skull, by Dr J. Arnold, Heidelberg (Pl. V.) XIX. (On the development of the sarcoma in the muscles, by Dr A. A. Sokolow, St. Petersburg (Pl. VI.-VII.) XX. Studies on the changes in the tissue of the brain, and their course in progressive paralysis of the insane, by Dr. A. Lubimoff, Moscow (Pl. VIII.-IX.) XXI. A case of aneurism and pneumonia syphilitica, by Professor H. Hertz, Amsterdam. XXII. On the mode of occurrence of hæmorrhage after closure of the blood vessels, by J. von Zielonko, St. Petersburg (Pl. X.) XXIII. Contribution to the pathological anatomy of *Lepra Arabum*, by Dr R. Thoma, Heidelberg (Pl. XI. and XII.) XXIV. Contribution to the question of the origin of the physiological curves of the vertebral column in man, by Dr J. Balandin, St. Petersburg (Pl. XIII.-XIV.) XXV. Smaller communications. 1. On the mycosis of the lungs in whooping-cough, with hints as to a method of treatment, by Dr L. Letzerich, Braunsfels (Pl. XI., figs. 1-3.) 2. Supplement to paper "A sure sign of the occurrence of death for medical and lay men," by Dr Magnus, Breslau. 3. *Varix verus* of the falciform (longitudinal) sinus of the dura mater, by Dr F. Meschede, Schwetz. 4. Survey of the swine killed and examined for trichina from Easter 1869 till 1871, in Braunschweig, by Dr Uhde. 5. On the length of life and retention in the body of the bothriocephalus latus, by Professor Fr. Mosler, Greifswald. 6. The symptomatology of myelogenous leucæmia, by the same. 7. To the discussion on tumours of the brain, by Dr E. Kotsonopoulos, Nauplia. 8. Congenital adenoma of the mucous membrane of the trachea in the tiger, by Dr Th. Simon, Hamburg.

XVIII. Primary Sarcoma of the Skull (Arnold).—The author here gives three cases of malignant tumour of the skull, the first of which contrasts with the other two chiefly from the fact of its being of periosteal while they were of medullary origin. In connection with this fact he notices the great tendency to ossification exhibited by this first tumour, this of course being consistent with the bone-forming powers of the periosteum. He also notices how this tumour like others, although generally hard and dense, gets softer and juicier when it bursts into a cavity. In the second case the diploë was the seat of a number of tumours of various sizes, which caused disappearance of portions of the bone, and so divided the calvarium into a series of loosely connected plates. Similar tumours developed in the ribs, vertebrae and sacrum. There were also secondary tumours in the liver, spleen, and lymphatic glands of the neck. The third case described is one which originated apparently in the basilar portions of the occipital and sphenoid (os tribasilare of Virchow), and the upper cervical vertebrae. There were similar tumours in the ribs, but not in the liver and spleen.

XIX. Development of Sarcoma in Muscle (Sokolow).—It is well known that sarcomatous tumours often invade muscles, and it has been a

question whether in doing so the actual muscular elements are converted into sarcomatous tissue, or whether the proper muscular tissue just disappears before the advancing tumour. In this point is included the question of the possibility of muscular tissue being converted into a tissue of the connective tissue type. The author considers that his observations answer this question in the affirmative. He bases his results on three cases of spindle-cell sarcoma, and from the investigation of these he concludes that from the proper muscular elements, that is to say, from the nuclei of the fibres, a spindle-cell tissue is developed exactly the same as that of the original tumour. In all these cases the affection did not begin in the muscle, but spread to it from neighbouring parts. Further, only a few of the muscular tissue elements undergo these changes, the most undergo simple atrophy. The paper is accompanied by a number of good microscopic drawings.

XXV. 1. Nature and Treatment of Hooping-Cough (*Letzerich*).—This author, who is especially known as upholding the fungoid nature of diphtheria, in the present paper states that hooping-cough is also due to the presence of a fungus in the air passages. He believes that the fungus in bad cases penetrates into the lung alveoli, and that the symptoms of hooping-cough are due to the irritation of this fungus. He states, however, that it does not, like the diphtheria fungus, penetrate into the circulation. Now it is known that quinine hinders the development of fungi, and the author states that the treatment with quinine introduced by Jansen is very useful. He himself recommends a local application of quinine in powder by insufflation, along with bicarbonate of soda and gum arabic, the former to dissolve the mucus, and the latter to cause the powder to adhere. His powders contain from $1\frac{1}{2}$ to 2 grains of chloride of quinia, as much bicarbonate of soda, and about double the quantity of gum arabic. The insufflation is repeated night and morning, and care is taken that the powder is blown in while the child is making a deep inspiration (as in sobbing), so that the agent gets properly at the mucous membrane of the trachea where the fungus is chiefly situated. The author has found great benefit from this treatment.

XXV. 5. Longevity of the *Bothriocephalus Latus* (*Mosler*).—The author relates two cases of persons who were the hosts of the tape-worm named above; in the one case the animal was retained 14, and in the other 6 years. In the former case the man seems to have got the worm in St. Petersburg in 1859, and it was only finally expelled in 1873. He passed through attacks of typhoid fever, and intermittent fever, but neither the diarrhoea of the one nor the high temperature of the other, sufficed to make the worm quit its hold. He had also used various 'worm-cures' with no effect.

VOL. LVIII. PART I., JULY, 1873.

CONTENTS.—I. From the chemical laboratory of the Pathological Institute at Berlin. On the possibility of the withdrawal of alkalis from the living animal, by Dr E. Salkowski. **II.** On a peculiar form of chronic hæmorrhagic peritonitis, and the hæmatoma of the peritoneum, by Dr N. Friedreich, Heidelberg. **III.** Neuropathic origin of simple hydruria (diabetes insipidus) from epidemic cerebro-spinal meningitis, trauma and syphilis, by Prof. Mosler, Greifswald. **IV.** On the extension of melanoma by embolism, by Prof. Eberth, Zurich. **V.** The histology of the heart, by Dr P. Langerhans, Freiburg (Plate I.). **VI.** On stratified epithelium, by the same (Plate II.). **VII.** Forty bath-days, a comparative

balneological study, by Dr L. Lehmann (Eynhausen). VIII. On the internal use of sulphate of atropia, for profuse sweating, especially the night-sweats of phthisis, by Dr Fräntzel. IX. On brown induration of the lungs, by Dr J. Orth, Bonn. X. The pathological histology of the female breast, by Prof. Th. Langans, Berni (Plate III.).

II. A Peculiar Form of Chronic Peritonitis (Friedreich).—The author describes two cases of peritonitis in which the condition resembles very much that seen in the dura mater in the disease which Virchow calls chronic hæmorrhagic pachymeningitis. That is to say, the peritoneum was covered internally by a false membrane in several layers, those layers nearest the peritoneum being obviously the oldest. The false membrane contained abundant granular pigment, and in the most superficial layer which is much softer than the deepest ones, there were recent blood-clots. This chronic inflammation of the peritoneum appears to have been secondary to ascites due to cardiac disease. In both cases paracentesis abdominis was performed, in the first case sixteen times, and in the second twice, and the author supposes that the removal of pressure from the abdominal well, due to the tapping, may have induced a capillary fluxion in the peritoneum, and so led to the chronic inflammation. He notes that in one of the cases there was the similar form of inflammation of the dura mater already referred to.

III. Diabetes Insipidus from Disease of the Brain (Mosler).—From physiological experiment it seems likely that different parts of the medulla oblongata are concerned in the production of excess of urine on the one hand, and the sugar in the urine which is the characteristic phenomenon of diabetes mellitus on the other. At least, experiment has shown that both conditions may arise from affections of the nervous centres. In the present paper the author gives some cases in which the occurrence of polyuria or diabetes insipidus is ascribed to affections of the brain. The first case was one in which after an attack of epidemic cerebro-spinal meningitis there remained increase of the quantity of urine passed. In this case the local disease had probably produced some structural change in the fourth ventricle or its neighbourhood. The second case is one in which a similar symptom resulted from a fall on the head. In this case the polyuria was probably due to hemorrhage into the fourth ventricle with rupture of the brain substance, the healing of which would leave a cicatrix. The symptom lasted 14 years, and was much benefited by large doses of acetate of lead combined with opium. The author has found acetate of lead a very efficient means of causing contraction of the vessels of the kidney, and he gives it with great advantage in catarrhal pyelitis. The third case is one of syphilis, in which polyuria was the first symptom of syphilitic disease of the brain. There followed various other cerebral symptoms, such as epileptiform convulsions, and after death there was extensive softening in the left hemisphere, in the medulla oblongata and the pons.

IV. Extension of Tumours by Embolism (Eberth).—The case recorded in this paper is interesting as showing how the extension of tumours to distant parts may occur. The eyeball was extirpated for melano-sarcoma originating apparently in the choroid. After 19 months, signs of tumour in the liver appeared, followed by rapid emaciation and death in other two months. There was found after death extensive melanoid sarcoma of the liver, and in addition melanoid and other cells were observed in the blood-vessels of the kidney and spleen. There was evidently here a passage of the solid elements of the tumour into the blood, and a direct infection of distant parts by these elements. This observation may be important as indicating how tumours may spread. In this case the cells were pigmented so that t'

could be readily recognised, and we must suppose that in other cases where their recognition is not so easy, a similar transportation and spread of the tumour by embolism takes place.

VIII. Use of Atropine against sweating (Fräntzel).—It is known that sulphate of atropine has been used both in this country and America to check the sweating especially of phthisis. The present author tested it in 75 cases in the Charité in Berlin, and is very well satisfied with the results obtained. He gives 1-60th of a grain in pill, and in only four cases has he required to discontinue it on account of diarrhoea. He uses it not only in the sweating of phthisis but also in that of other diseases, such as acute rheumatism, or convalescence from trichiniasis. The author supposes that it acts constricting the small arteries which supply blood to the sweat-glands, the sweating being probably due to relaxation of these arteries. Several observers have shown that atropine produces marked narrowing of small arteries. The dryness of the throat and mouth, and the parchment-like dryness of the skin in the advanced stage of atropine poisoning, are also probably due to constriction of the small arteries.

X. The Histology of the Female Breast (Langans).—Here we have a very full account of the normal and pathological histology of the female breast. It is impossible to give anything like an abstract of the paper, but it may just be noted, that he considers that cancer of the mamma has its origin in the gland acini. In cancer there are nests and processes of cells, and it might be a question whether these are not simply widened gland-acini. The author can find no tunica propria around these collections of cells, and considers that they are not simply widened acini, but have grown out from the acini, possibly penetrating into the lymphatic passages. On the other hand he looks on sarcoma as originating entirely from the connective tissue stroma of the gland.

VOL. LVIII., PART II., AUGUST, 1873.

CONTENTS.—XI. Report on the diseases observed in Vera Cruz during the last six years, by Dr C. Heinemann, Vera Cruz. XII. A case of pregnancy in a rudimentary uterine horn; death from hemorrhage. Transmigration seminis extrauterina, by Dr R. Jaensch, Breslau. (Pl. IV.) XIII. On diapedesis, an experimental study, by Prof. J. Arnold, Heidelberg. First part (Pl. V). XIV. On diapedesis, by the same. Second part (Pl. VI). XV. On varicose hypertrophy of the nerve fibres of the brain, by Prof. M. Roth, Basel (Pl. VII). XVI. Anatomical condition in spinal paralysis in children, by the same (Pl. VII. fig 18). XVII. The pathological anatomy of dementia paralytica (general paralysis), by Prof. Ludwig Meyer, Göttingen (Pl. VIII). XVIII. The development of the diphtheria fungus, by Dr L. Letzerich, Braunsfels (Pl. VIII). XIX. Smaller communications: 1. On new formation of brain substance in the form of tumours on the surface of the convolutions, by Dr Th. Simon, Hamburg; 2. Myoma levicellulare of the right nipple, by Dr Sokolow, St. Petersburg; 3. Severe attacks of illness from swallowing foreign bodies, by Dr Rayss, Worms; 4. Varicose axis-cylinders in the central nervous system, by Dr Otto Obermeier, Berlin; 5. Report of the swine killed and examined for trichinae, in Braunschweig, from Easter 1871 to 1872, by Dr C. W. F. Uhde; 6. Description of a monstrous birth (absence of anterior wall of abdomen with ectopia viscerum and defective development of the extremities), by Dr Reinold Hein, Dantzig; 7. Statement in defence, by the adjunct-colleagues of the Royal Leop. Car. Academy; 8. Erratum by Dr Fräntzel.

XIII. and XIV. On Diapedesis (Arnold).—We have in these two papers the results of a large number of experiments made on the frog's tongue, with a view to determining the mode of escape of blood-corpuscles from the vessels after obstruction of veins. He ligatured either the central or lateral veins of the tongue, and then submitted the capillaries which feed these to microscopic examination. There was, doubtless as a result of the obstruction of the vein, greatly increased pressure within the capillaries, and this seemed to manifest itself in the form of numerous minute bulgings or pouches out from the vessels. Further, he saw how the red, and (more rarely) the white blood corpuscles were made to slip through the vessels, this process of diapedesis being apparently a passive one, and due to the increased pressure in great measure. Thus he observed, how when a red blood corpuscle had got through the wall there was generally a current of fluid from the vessel through the same aperture, till it got filled again by a fresh corpuscle. But that diapedesis is passive seemed also to be shown by the fact that when finely divided vermilion was previously introduced into the circulation, it also escaped through the same channels as the red blood corpuscles. Again on injecting the vessels after death, in cases which had already been the subject of observation, with a blue coloured solution of gelatine, he found that it also escaped from the capillaries, and that often by a channel in which a blood corpuscle was sticking. Then further, when the capillaries were stained in the usual way with a silver solution there were found to be numerous dark points and circles visible in the internal surface which were always at the borders of the endothelial plates. The circles at least were apertures through which blood-corpuscles had escaped. The question arises, however, whether any openings exist in the capillaries normally, and these are only enlarged when the pressure is increased—or whether they are entirely produced by the increased pressure. The author, from his observations, concludes that there are normally in the capillaries minute apertures between the endothelium cells which he names *stigmata*, and that under the conditions presented they enlarge and give passage to the blood-corpuscles; these enlarged *stigmata* he would name *stomata*. The second part of the paper before us is taken up with the fate of the corpuscles which have been pushed out of the vessels. As will be noticed, the escape of these corpuscles is a purely passive process, not a wandering out, and after they have left the vessels they may be carried away from them to a distance by the currents which rush through the *stomata* when a corpuscle leaves one for a moment empty. In their subsequent course the corpuscles are still passive. The author describes somewhat minutely how, either isolated or in groups, they gradually lose their colouring matter, and finally disintegrate. During the process of decolourisation the groups of red blood corpuscles often look delusively like large colourless cells with red blood corpuscles inside it, but this the author says is not the case, and he believes the corpuscle-holding cells of some authors to be really groups of red blood-corpuscles undergoing these changes. The corpuscles sometimes, though rarely, form solid pigment, either in granules or in needles. Lastly, the author has not been able to discover any other mode of disappearance of the exuded blood-corpuscles than that above described. They may, however in part, be carried into the lymphatics for anything he knows.

XVII. The Pathology of General Paralysis (Meyer).—With most observers the author looks on general paralysis as a general chronic inflammation of the brain and its membranes, and in other communications he has sought to confirm this view by records of temperature, &c. In the present paper he goes on the basis of pathological anatomy, and tries to show that

there are the anatomical characters of an inflammation. He has examined twenty cases in which the disease was comparatively acute, and in which death took place at a comparatively early period, so that an opportunity was afforded of examining the brain at the outset of the pathological process, and before the occurrence of degenerations which might be secondary. A brief history of these twenty cases is given, and the usual symptoms were at first headache, then maniacal outbreaks like those of fever delirium, and sometimes death occurred before the development of general paralysis. The brain was examined microscopically after the fresh tissue had been macerated from 12 to 24 hours in a weak bichromate of potash or chromic acid solution. The author believes the inflammation to be rather what might be called interstitial, that is to say, it does not affect the nervous elements directly, but rather the vessels and their neighbourhood. He found the vessels, especially the smaller arteries and veins (transition vessels), surrounded by collections of cells. This existed first in the cortical substance of the cerebrum, but in later stages penetrated to the medullary. The inflammatory new formation was not homogeneously distributed, but seemed to affect numerous minute centres. In accordance with these minute characters the brain, to the naked eye, presented swelling and vascularisation of the cortex. This then seemed to be primary lesion, but it was followed by various other changes chiefly in the direction of degenerations. The vessels especially were commonly the seat of degeneration, fatty, calcareous, or sclerotic. There were also in some cases partial dilatations of the vessels, sometimes amounting to fusiform aneurisms. In respect to the proper nervous tissue, he found it in early cases unaltered, but later on there was commonly atrophy, and a granular condition of the ganglion cells. There is not, as Meschede asserts, a primary of fatty-pigmentary degeneration of the ganglion cells.

TRANSACTIONS OF The Medico-Chirurgical Society.

SESSION 1873-74.

FIRST MEETING, 5th Sept., 1873.—Dr Scott Orr, President, in the chair.

The following gentlemen were appointed office-bearers for the session:—*President*—Dr Robert Scott Orr. *Vice-Presidents*—Dr Andrew Fergus and Mr John Reid. *Council*—Mr J. Pollock, Mearns; Dr R. Renfrew; Dr George Miller; Dr T. D. Buchanan; Dr R. Stewart, Coatbridge; Dr James Scanlan; Dr Alex. Patterson; Dr James Dunlop. *Secretaries*—Dr Robert Perry and Dr Joseph Coats. *Treasurer*—Dr H. R. Howatt.

Dr Perry, one of the Secretaries, read a communication from a corresponding member of the society, Assistant-Surgeon G. Chunder Roy, M.D., F.R.C.S.,

“ON THE SOLVENT ACTION OF PAPAYA JUICE ON THE NITROGENEOUS
ARTICLES OF FOOD.”

(See p. 33 of present Number.)

Dr Perry said that he found, on referring to well-known botanical works, that the remarkable property of the papaya juice to which Dr Roy referred

had already been made the subject of experiments, and that the results published did not materially differ from those which Dr Roy had obtained.

The President thought the paper a very interesting one, and he hoped that Dr Roy would put them still further under obligation by sending, for the purpose of experimentation at home, a quantity of the juice. If its solvent properties over nitrogenous substances were such as were represented, it would probably turn out to be a valuable substitute for pepsine.

Dr Watson said that the chief interest of the paper was physiological. The fact which Dr Perry had mentioned, that others had investigated the properties of the juice before Dr Roy, did not detract from the value of that gentleman's researches. He trusted that he would continue his investigations on the subject. It was obvious that what was needed was (1) a chemical analysis of the juice, and (2) a more extensive series of experiments on its physiological action. He was not quite sure that he apprehended the meaning of some of Dr Roy's statements in regard to its action. He would like to know whether it was really the fact that, as he understood was stated in the paper, this principle acted on albumen in an alkaline medium as well as in an acid medium. The essayist did not appear to be aware of Lehmann's interesting observation of the change of physiological action of saliva, gastric juice, and pancreatic fluid respectively, which would result from a change of each of their chemical reactions. He trusted that the subject of the action of this juice would soon receive an exhaustive investigation.

Dr Howatt stated that the action of the papaya juice had been carefully investigated by a committee in India, and the report of this committee—which, he might add, was composed of men in every way capable of conducting the enquiry—spoke in very doubtful terms of the existence of the alleged solvent action of the juice on nitrogenous compounds.

Dr Joseph Coats said that Dr John Davy, to whose paper Dr Howatt, he believed, referred, raised the question whether the effect in meat was due to the action of the juice, or was simply the result of decomposition in a warm climate. The question was left by Dr Davy *sub judice*, and, therefore, the investigations of Dr Roy, which had been conducted in a very scientific manner, were by no means out of place. Whether he had finally settled the question was a different matter; but, at all events, he had clearly apprehended the points to which it was important to direct attention. Thus it had been alleged that the resulting change was caused by decomposition, but Dr Roy had stated that it was much too rapid to be due to that cause. Further, he had shown that the solution was hastened by boiling; that there was an actual solution, from which, after filtration, and by the addition of an acid and heat, the substance was again precipitated. That was a most important observation; and the whole paper was valuable, not only in what it stated, but in what it suggested.

On the motion of the President, the Secretary was instructed to thank Dr Roy, in name of the society, for his communication.

SECOND MEETING, 3d Oct., 1873.—Dr Scott Orr, President, in the chair. James S. Donald, M.B., C.M., Town's Hospital, and James W. Anderson, M.D., Burnbank Terrace, were elected members of the Society.

Mr D. C. M'Vail read an

"INQUIRY INTO THE CAUSE OF PULSE DICROTISM."

(See page 1 of the present Number.)

The President said that the paper was one of a class with which

were seldom favoured in the Society. It was obviously the result of great thought and labour.

Dr Eben. Watson was very glad to find one of his old pupils, in the intervals of his leisure, turning his attention to some purpose to physiological subjects. He believed it was to him (*Dr Watson*) that *Mr M.V.* had referred as holding the first-mentioned of the three theories of Dicrotism; viz., that it was due to a rebound of blood from the aortic valves. This theory, which he had in substance taught, was undoubtedly the one which would most readily occur to the investigator in any enquiry on the subject. But he must at the same time admit, that if *Mr M.V.* was correct in his observation that dicrotism was not synchronous with the second sound, that, of course, would be a strong, indeed a conclusive argument against the theory. It had hitherto been his impression that the two phenomena occurred at the same instant. *Mr M.V.* appeared to have based some of his conclusions on those experiments with mechanical arrangements which were supposed to be analogous to those in the living body. He very much questioned, however, whether these arrangements effectively imitated nature. It was of the utmost importance to keep in view the complex properties of the arterial tube. It was not merely an elastic tube, but a tube whose elasticity was governed, so to speak, by its contractility. There was nothing analogous to this in any artificial arrangement. He agreed, with *Mr M.V.*, that the theory of *Marey* and that of *Burdon Sanderson* were substantially the same. This theory of a recoil from the periphery was perhaps a little far-fetched, and *Mr M.V.*'s statement, that the dicrotic wave was manifested at the centre before it showed itself at the periphery, was no doubt an argument against it, though not a conclusive one. Of *Mr M.V.*'s own theory he would defer giving any opinion till he had an opportunity of reading the paper.

Dr Gairdner said that the paper was one which obviously required, for its proper comprehension, not merely to be read, but to be carefully studied. His attention had been more directed to the pathological indications afforded by the sphygmograph; but the physiological question discussed by *Mr M.V.* was one of the greatest interest, and the theory which he had propounded, whatever its merits, had obviously been carefully elaborated.

Mr Samson Gemmell admitted that *Mr M.V.*'s theory showed great ingenuity. He thought, however, that it would be premature to throw over *Marey's* theory on the strength of experiments on elastic tubes. Every one would see the force of *Dr Watson's* objections to these experiments. *Dr Watson* had spoken of the phenomenon of dicrotism as probably caused by the rebound of the wave from the aortic valve. Now, he (*Mr G.*) had taken sphygmographic tracings in two cases of aortic regurgitation, and in neither was there any dicrotism. In one there was no ossification whatever. He did not feel himself in a position to pronounce a strong opinion on the theory of *Mr M.V.*, but he might throw out the suggestion that probably the little upper tracing with the sphygmograph was due simply to the rebound of the lever.

Mr M.Vail, in reply, said that, in regard to *Dr Watson's* objection, that mechanical arrangements could not imitate the contractility of muscular fibre, it must be remembered that dicrotism occurred in the aorta, in which muscular fibre was practically wanting. *Mr Gemmell*, he thought, had somewhat misunderstood his paper. One explanation would dispose of the suggestion of *Mr Gemmell*. In the instrument which he (*Mr M.V.*) used, there was no possibility of the lever starting off, as he had worked with a weight of one pound placed on the top of the lever.

THIRD MEETING, 7th Nov., 1873.—Dr R. Scott Orr, President, in the chair.

Thomas Buchanan, Jun., M.B.; Henry E. Clark, M.R.C.S.; Samson Gemmell, M.B., C.M.; James Watson, M.B.; and John Weir, M.D., all resident in Glasgow, were elected members of the Society.

EXCISION OF HEAD OF FEMUR.

Dr Morton exhibited two cases of recovery after excision of the head of the femur, with good use of the limb. He had published the details of the first of the cases already, and would not again refer to it. The second case was that of a lad 15 years of age, who was admitted to the hospital on the 13th Nov., 1872, in a state of extreme suffering from *morbus coxæ*. There were the usual symptoms—a considerable amount of swelling, with great pain, but not much emaciation, and, therefore, the lad was a good subject for the operation, which was performed on the 27th Nov. The temperature did not rise at any time above 102°. At the end of three months he was able to get up by the aid of a Sayre's splint. He was discharged well on the 1st March, and he afterwards went for some time to the Convalescent Home. Without pretending to perfect accuracy in his statement, he believed that 13 cases had been operated on in the Glasgow Infirmary, but the results were not always so favourable as in these two cases exhibited. He himself had operated on 9 patients, of whom 3 died, 5 recovered, and 1 was still under treatment, but recovering. *Dr Lyon* operated on one, but was compelled afterwards to amputate at the hip-joint, and the patient ultimately recovered. The other 3 cases died. He thought that the rules laid down in text-books limited the operation to a period considerably too advanced. From his experience he was led to believe that children under five or six years of age were not good subjects for the operation, as they did not stand long confinement in bed. The best age was from 8 to 15 or 16. He had looked up the statistics of the relative fatality with and without operation, but there was nothing conclusive on the subject up to this time.

Dr Lyon was of opinion that this operation was of invaluable service in diseases of the hip-joint. He was well aware of the fatality attending the disease when left without interference.

Dr George Buchanan thought it very necessary to distinguish between *morbus coxæ* in its milder and initiatory stages, and *morbus coxæ* advanced to the stage in which an operation was advisable. There were a great many cases in which there was no displacement and no suppuration, and in which no one would dream of excising the bone as a means of cure. These were not the kind of cases under consideration, and any statistical facts which might be collected would require to discriminate between the cases fit for operation and those not so. There was no question that when there was dislocation and suppuration, excision of the head of the bone was the proper practice, and it was exceedingly gratifying to find that the results were often so successful as in those cases which they had just seen.

Dr Smith (Govan), said that he was not quite sure that the indications of operation were so simple and unmistakable as had been assumed. His own experience was generally favourable to leaving these cases to nature. He had seen repeatedly cases in which there was dislocation, and even a few in which suppuration existed, which had recovered without operative interference. The operation was rather formidable; many fatal cases had occurred under it, and it was no light matter to subject the patient to it.

Dr Watson to some extent agreed with what *Dr Smith* had said. The operation had been much more frequently performed in England than

Scotland, and he gathered from the statistics given in Holmes' Surgery that it was there performed sooner than they in Scotland thought advisable. He agreed with Dr Smith that there were a great many cases in which dislocation (or so-called dialocation) existed, which did not call for excision of the head of the femur. There was a very considerable difficulty in the diagnosis, whether the pelvic bones were affected. He knew of no absolutely certain marks to guide them before the operation. This, he believed, was the reason that so many of the cases operated on resulted unsuccessfully. He (Dr W.) had operated only once, and the patient was doing well. In his other cases he had generally managed by splints and other treatment to cure the disease. But surgeons often lost sight of these cases, and of their after-history they knew little or nothing. He did think, however, that in regard to the operation, they should exercise some little Scotch caution. He did not, however, agree with Dr Smith in thinking the operation in itself a formidable one; in fact, it was rather too easy, and they might be tempted to rush to it without adequate cause.

Dr Morton agreed with Dr Watson that surgeons lost sight of their cases in hospital practice, and they also did so of their unsuccessful cases in private practice. Those who recovered were constantly before them, hence surgeons were somewhat too apt to under estimate the fatality of the disease. The operation was by no means a formidable one in general. His experience had taught him the futility of laying down any precise rule in regard to operative interference. The last case he had operated on had very extensive suppuration, but no dislocation. The bone was more spongy than any femur he had ever touched with the knife. What he especially contended for was that the operation should be performed early, and not as *dernier ressort*, as seemed to be taught in books.

After giving a brief historical account of the laryngoscope, illustrated by the exhibition of the principal forms in use, Dr Watson read a paper

"ON SOME OF THE NERVOUS AFFECTIONS OF THE LARYNX,"

(See p. 19 of present Number.)

The President had been always sceptical of the value of topical applications to the larynx in hysterical aphonia. In such cases the voice sometimes disappeared suddenly, and as suddenly returned. Sometimes it disappeared suddenly in the course of pregnancy, and did not re-appear till after the birth. He would like to hear Dr Watson's opinion of the cause of the peculiar paralysis in diphtheria, and if there was any good method of treatment in such cases.

Dr Smith (Govan), thought the cases Dr Watson had brought before the Society of remote irritating causes acting on the larynx, such as worms in the intestines, were extremely interesting. A similar case, he believed, was recorded in Graves' Clinical Medicine, in which an old woman recommended a dose of turpentine for a throat affection, with the result of curing it from the anthelmintic properties of the drug.

Mr M'Vail said that, for general practitioners, the elaborate instruments exhibited that evening were unsuitable, and for the bulk of the profession the pocket laryngoscope must suffice. But there were three difficulties in the use of it, (1) to get the light from the reflector thrown into the throat; (2) to place the laryngeal mirror that the light will be thrown on the glottis; and (3) that the rays given back from the laryngoscopic mirror will fall on the eye of the operator. By long practice, a different and complicated series of movements would no doubt become automatic, but for the beginner it was very difficult in the exceedingly short time—often during the interval between two inspirations—in which an observa-

tion could be effected. He thought that much of the difficulty would be obviated by constructing a reflector with several faces. If the reflector could send, say twenty images to the operator, instead of one, he would have much greater liberty of motion than at present, as he could hardly fail to catch one of the images.

Dr Watson said that, with reference to hysterical aphonia, his remarks were not intended to apply to cases in which the cause was merely temporary. In these no one would attempt topical treatment, as the morbid condition would disappear with the removal of its cause. *Dr M'Vail* was in error in regard to the length of time that the larynx could be under observation with the laryngoscope. If the mirror was properly heated, there was no objection, but the contrary, to the patient breathing.

FOURTH MEETING, 5th December, 1873.—*Dr Fergus*, Vice-President, in the chair.

David Knox, M.A., M.B., C.M., Glasgow University, was elected a member.

Dr J. St Clair Gray read a paper on

“THE SACRUM IN ITS RELATIONS TO RUPTURE OF THE PERINEUM,”

and illustrated the subject by showing a number of pelves.

Dr Hugh Thomson said that the object of the paper seemed to be to show that differences in the anatomical arrangement of the pelvic bones must to a great extent modify the process of parturition. He thought this position was unassailable, and the array of pelves by which he had illustrated it was also very interesting. One of these pelves was, he thought, unique of its kind; he had never seen one with the sacrum so straight.

Dr Lyon also thought that a pelvis of this kind was seldom met with. He was an advocate of support to the perineum, and, in the whole of his practice, he did not remember of a case of rupture.

Dr James Gray said that, in regard to supporting the perineum, obstetricians might be divided into three classes; one gave support in all cases, (some of them, such as Ramsbottom, recommending support of the most energetic kind); others discarded this practice altogether, and let the perineum alone; while another class, such as his old teacher, *Dr Hamilton*, of Edinburgh, recommended to pull it backwards. Now, why did these differences in theory and practice occur? The answer was that each of these classes was right in regard to particular kind of cases, and, of course, wrong as regards others. The object of the paper was to show that the practice which would be the best in a pelvis of one axis, might be the worst in regard to one of another axis. This, he thought, no obstetric writer had before shown.

Mr John Reid said in respect to the formation of the pelvis, there was doubtless truth in the statement that it influenced the position of the head in labour. He had lately lighted on the narrative of a case in which the writer stated that the vertex was so directed to the centre of the perineum that that structure formed the central point through which the head tended to pass, and the head actually made a rent through the centre of the perineum, extending back into the rectum, leaving the fourchette entire. On examination the woman was found to have a very straight sacrum. The accoucheur in such a case should have used the forceps as soon as he saw the position of the head.

Dr George Miller approved of supporting the perineum, and also of lubricating and stretching it, by drawing it down towards the rectum.

This he did only during a pain, and the patient always felt eased by the practice. He had had only one case of rupture in all his practice, and that occurred lately.

Mr Henry E. Clark, looking at the question from an anatomical point of view, could have no doubt that the curvature of the sacrum and the prominence of the coccyx must to some extent influence the direction of the vagina. But the curvature of the sacrum was very far from being necessarily an evil. In these cases which Dr Gray has classed as coccygeal, he thought, speaking only on *a priori* grounds, that labour must be too quick to be very safe.

Dr St Clair Gray, in reply, said that the straight form of sacrum was not so rare as some of the speakers imagined. Rupture of the perineum happened both in the straight and curved cases. In some, it must be remembered, the perineum was exceedingly friable, and in others very tense.

TRANSACTIONS OF The Southern Medical Society.

SESSION 1872-73.

TENTH MEETING, 6th MARCH, 1873.—Dr Pearson read notes of the following cases:—

1st. *Case of Ovarian Dropsy*, occurring in a widow aged 56, and first noticed about 16 months before Dr Pearson saw her. The tumour burst spontaneously while he was in the house with the view of tapping it, the rupture occurring through an ulcer about the size of a penny piece, which he found at the most prominent part of the abdomen. Patient died the following day, apparently from exhaustion.

2nd. *Case of Erysipelas of the Face*, occurring in the ninth month of pregnancy. Blood and tube casts were found in the urine, and there was great pain over loins. Labour set in spontaneously, resulting in the birth of a healthy female child, and the ultimate recovery of the woman after a tedious illness.

3rd. *Case of Pregnancy*, in which pain was complained of in right groin from the time of quickening. About six weeks before confinement patient had bearing down pains, which were accompanied by a discharge of blood and pus from the vagina. During labour there was a profuse clay-coloured discharge. The child was born alive, and its expulsion was followed by a gush of purulent matter, and subsequently by flooding. The placenta was adherent, and, on examination after removal, was found softened on one side. Dr Pearson thought there had been an abscess on the part of the uterine parietes in apposition with the softened portion of the placenta.

TWELFTH MEETING, 10th APRIL. Dr White read the following

“NOTES OF A CASE OF FOOT AND MOUTH DISEASE IN THE HUMAN SUBJECT.”

A. B., female, came to Glasgow, a few months ago, from the country, to learn dressmaking. Complained of sore throat. Since she

came to Glasgow her diet had been chiefly farinaceous, with milk got from an eating-house. Nothing peculiar was observed by her in the milk, and the source of supply could not be traced. When first seen, numerous small white patches were observed on the dorsum and inferior surface of the tongue, extending to the tonsils, and to each side of the buccal cavity. Pulse 90, small, but firm.

During the night patient was sleepless, and on the following day her pulse was 100. She complained of itchiness in the hands and feet, and of increasing dysphagia. There was profuse pytalism, and the white patches on the tongue had coalesced.

(Third day.) A measly rash was observed on the palms of the hands, and, less distinctly, on the soles of the feet.

(Fourth day.) Pulse 110; salivation excessive; mouth severely ulcerated; distinct papular eruption on the palms. Soles still measly; no eruption on any other part of the body.

(Fifth day.) Eruption on palms vesicular and semi-confluent; feet still not so bad as the hands.

(Sixth day.) Pulse 110; eruption on skin pustular, on feet vesicular, pytalism still severe, numerous bleeding points in mouth, with loose shreds of mucous membrane.

Improvement now set in, and progressed so rapidly that on the tenth day she was taken home to the country, and was soon well. No other person in the house where she lodged was affected. The treatment consisted of gargles of chlorate of potash and borax, and tincture of perchloride of iron, and sedatives were also given.

Dr White also referred to the cases reported in the *Glasgow Medical Journal* for May, 1872, by Dr John Wilson, entitled "Ulcerative stomatitis with yellow palms." Having seen these cases along with Dr Wilson, Dr White was able to state that they greatly resembled the one now narrated, but in Dr Wilson's cases there was no eruption on the hands and feet—merely a yellow discolouration, and, further, the condition of the mouth was not nearly so bad as in his own case. In Dr Wilson's cases the milk used by the family was proved to be bad.

20th June, 1873.—The annual picnic of the Society was held at Luss.

SESSION—1873-74.

The thirtieth annual meeting was held on October 2nd, when the following gentlemen were elected office-bearers, namely—*President*, Dr James Dunlop; *Vice-President*, Dr John White; *Treasurer*, Mr E. McMillan; *Secretary*, Dr John Dougall; *Seal Keeper*, Dr R. T. Paton; *Court Medical*, Dr Eben. Duncan (convener), Dr R. W. Forrest, Dr Tindal, Dr W. Rice, and Dr J. H. Menzies.

A committee was appointed to draw up a short biographical sketch of the deceased Dr James Stewart, the founder of the Society.

The annual supper was held on 17th October—Dr James Dunlop, president, in the chair.

SECOND MEETING, 30th Oct., 1873.—The Committee appointed at the annual meeting submitted a biographical sketch of the late Dr J.

Stewart, which was approved of, and ordered to be engrossed in the minutes; and the secretary was instructed to send a copy to the relatives of the deceased. A motion to alter one of the laws of the Society was then considered, and the discussion adjourned till the third meeting, on 13th November, which was wholly taken up with that business.

FOURTH MEETING, 20th November, 1873.—*Dr R. Forrest* read

“NOTES OF A CASE OF IMPERFORATE ANUS.”

It occurred in a male child born apparently at the eighth month. On the second day after birth, as it was found that the bowels had not acted, an examination was made, and the anus found absent, there being simply a dimple at the usual site of that opening.

An operation was agreed to, and performed about seventy hours after birth, the child showing at that time no signs of illness, but for several hours previously it had refused the breast. After cutting to the depth of fully an inch a bulging tumour was reached, and, while examining to see if it were the rectum, a small quantity of meconium matter and gas passed by the urethra. As the tumour seemed really to be the rectum, it was then punctured, and gave vent to a copious discharge of meconium. Owing to the depth of the wound, no attempt was made to draw the bowel down to the surface.

4th September, the day after the operation.—Child seemed well, and the bowels were discharging freely and intermittingly. A No. 12 elastic catheter was easily introduced into the rectum. Urine free from meconium was seen to pass during the visit.

6th September.—Child continues well, discharge from bowels still intermitting and becoming faecal; child reported to have passed a little faecal matter by urethra, about once daily, at the end of the act of micturition; bougie introduced with difficulty.

18th September.—Till this date, bowels reported to have been discharging freely and naturally, but to-day, failing to introduce a bougie, a pair of dressing forceps were introduced and the opening dilated by withdrawing them with the blades slightly opened. Child does not seem thriving.

23d September.—Child reported to have had profuse diarrhoea since last visit, and is evidently sinking. It died during the night, and no inspection was obtained.

FIFTH MEETING, 18th December, 1873.—*Dr Cassels* exhibited a cochlea, which he had removed in a necrosed state from a patient's ear. The point of interest in the history of the case, and to which attention was chiefly directed, was the good degree of hearing power, and the non-impairment of the perception of tones remaining, after removal of this portion of the ear. In order to a full comprehension of the interest attached to the case, *Dr Cassels* briefly noticed the minute anatomy of the labyrinth, and glanced at the theories advanced as to the functions of its several parts, more especially *Helmholtz's* recent theory concerning the functions of the *membrana basilaris*.

THE
GLASGOW & WEST OF SCOTLAND MEDICAL ASSOCIATION.

ANNUAL MEETING.

The Annual Meeting of the Association was held in the Faculty Hall, 242 St Vincent Street, on the 31st October 1873, at 4 P.M. There was a good attendance of Members. The President, Dr Allen Thomson, occupied the chair.

Dr Finlayson read

THE ANNUAL REPORT OF THE GENERAL BUSINESS COMMITTEE FOR 1872-73.

"The Committee congratulate the guaranteeing Members of the Association on the expiry of the Guarantee, as there is now a sum realised, amounting to £137 3s, which they recommend should be kept in reserve as a Guarantee Fund in case of adverse balances.

"The total gain in the present year amounted to £13 17s 6d, and this was added to the £123 5s 6d at the credit of the Association at last balance. The Income amounted to £198 17s 8d, and the Expenditure to £185 0s 2d. The Accounts were made up on this occasion to October 30th, on account of the delay experienced in sending out and recovering the Accounts,—a delay due to various accidental circumstances. No entry, however, was made of any subscriptions received in advance for next year, and these were carried forward separately, the present statement applies exactly to the transactions of the past year. Eleven subscriptions are still unpaid, but of these some will no doubt be recovered. The result of the year's operations may be regarded as satisfactory, especially when it is remembered that owing to the increased cost of production the Printers' accounts were this year £23 more than those of last year. The Committee took estimates from various printers for next year's contract, but they found that their present printers, Messrs Dunn & Wright, had still given the lowest estimate. No increase is to be made for next year's printing. The financial success of the undertaking has been due of course to the large amount of gratuitous labour bestowed on it by the Office-Bearers, and more especially by Dr Russell, the Editor.

"Owing to the frequent complication of accounts arising from the volume of the Journal beginning in November, it has been resolved to begin the next volume in January, so that the four issues may be comprised within the year. Certain changes in the rules will be proposed to adapt the annual meeting and the time for payment of subscriptions to this alteration. It is hoped that, by this alteration, members will more easily remember the proper time to remit their subscriptions, as this will now be at the beginning of each year. Much unnecessary trouble is given to the Secretary by a neglect to pay the subscriptions promptly.

"The Committee deeply regret that the Treasurer was unable, from the state of his health, to continue the discharge of his duties. His provisional balance sheet as at July 24th was found correct, and the funds were taken charge of, and the accounts made up to yesterday's date, by the Secretary, who acted as Treasurer also for the time being. The Committee desire to express their high appreciation of the onerous duties so diligently discharged by the Treasurer during the last five years.

"As Dr Finlayson, who has latterly been acting as Treasurer, as well as Secretary, has intimated his intention to retire from both offices, the Committee suggest the names of Dr John Wilson as Treasurer, and Dr Gavin Tennent as General Business Secretary."

Before moving the adoption of the Report, the Chairman proposed that, as the period of the guarantee had now expired, and as the Fund in reserve was sufficient to meet any unfavourable balances, an acknowledgment of the Editor's services, by a small honorarium, should be voted by the Association. He moved that £25 be deducted from the balance for this purpose. Dr Tannahill seconded this proposal, which was unanimously agreed to.

Alterations in the Rules with regard to the period of the Annual Meeting and other allied points were then approved of.

The following Office-Bearers for 1874 were then elected :—

President—Prof. ALLEN THOMSON, M.D., F.R.S.
Vice-Presidents—Dr EBEN. WATSON and Dr SCOTT ORR.
Treasurer—Dr JOHN WILSON, 252 West George Street.
Editorial Secretary—Dr J. B. RUSSELL, 278 Bath Street.
General Business Secretary—Dr GAVIN P. TENNENT.

General Business Committee.

PRESIDENT.	Dr JOSEPH COATS.
VICE-PRESIDENTS.	Dr ALEXANDER ROBERSTON.
TREASURER.	Dr W. T. GAIRDNER.
SECRETARIES.	Dr J. B. COWAN.
Dr GEORGE BUCHANAN.	Mr H. E. CLARK.
Dr JOHN COATS.	Dr JAMES FINLAYSON.

Obituary.

THE LATE DR JAMES STEWART.

THE profession here have lately had to mourn the loss of a senior and highly respectable practitioner, Dr James Stewart, who, for upwards of forty years, followed his professional avocations in Glasgow and its neighbourhood. He began practice in Parkhead, but soon removed to the South Side, where he practised for a series of years in Nicholson and Portland Streets. He filled the office of Surgeon to the Police (Southern District), and became a Medical Inspector of Factories when these offices were instituted; recently he held one of the most lucrative of such appointments. Dr Stewart also acted as one of the Medical Inspectors in criminal cases, and was an able medical witness in our courts. His memory will long be cherished in this city, and chiefly on the South Side, as the founder of the Glasgow Southern Medical Society,—one of the most vigorous and useful of our medical associations. To its members Dr Stewart was intimately known, and by them highly esteemed, especially for his social qualities and the liveliness and geniality of his disposition. His death was caused by renal disease, and took place on the 11th July last. Being an Artillery Medical Officer, he was buried with military honours in the Sighthill Cemetery.

THE
GLASGOW MEDICAL JOURNAL.

April, 1874.

Original Articles.

I.—SOME REMARKS ON INSANITY.

By STRETHILL H. WRIGHT, M.D., *Physician to Barnhill Hospital and Asylum, Glasgow.*

I FORMERLY, in the *Edinburgh Medical Journal*, published certain papers, in which I proposed certain groupings that seemed to help to clearness of view as regards the consideration of "Insanity." I then carefully stated a belief that all such groupings were contrivances only, by which our present intelligence might be assisted in gaining further insight into matters which in truth are bound up in the infinite unity of all things.

(a.) Under the head "Asthenic Insanity," I spoke of those cases of mental disorder which depend upon an asthenic state of the organism. This asthenic state may be congenital or acquired—the asthenia may depend upon an inherited deficient vigour of the whole or special parts of the organism. The asthenia may depend upon the operation of influences, which are extrinsic to the organism, but so modify that organism's original vigour as to produce "insane" actions of it, in whole or part.

(b.) In a subsequent series of three papers, headed "Some remarks on Insanity," I presented as follows:—

"It appears, on consideration, that insane individual peculiarity, where the insanity is the natural evolution of the individual organism, may be produced in three ways:—

"1st, By gradual evolution among the progenitors through various degrees of individual sane peculiarity, each degree differing more from the standard of sane individuality, till at last the individuality is recognised as insane by universal consent.

"2d, The insane individuality may be evolved by the influence exercised on the offspring by a specific temporary period of ill-health, affecting either parent while concerned in the procreation of the offspring; and this period of ill-health may be entirely abnormal to the parents' original constitution, transitory, and non-recurrent.

"3d, The insane individuality may be evolved by the influence of injury or constitutional disorder occurring in the life of the patient. In such cases, in the first instance, influences extrinsic to the organism must be held as causative of mental disorder; but these extrinsic influences produce such grave constitutional effects, that subsequent attacks of mental disorder arise from an intrinsic constitutional state, the result of influences extrinsic to the organism. The individual organism becomes so warped that it subsequently evolves itself as of insane peculiarity, although the general health may be entirely re-established, and remain good."

One can, of course, only judge of a man's life-conduct by the manifestations displayed by him through that organism which is his means of communication in the relations of the present time. The "Sanity" or "Insanity" of a man is decided by the observer or observers, according to individual or conjoint judgment as to the appropriateness of a man's actions to the motives to action which can be ascertained by observation to have been brought to bear upon that man. The truth of their verdict depends in great measure on the observer's capacity for appreciating such motives to action at their true value.

The question, "What is insanity?" arises in various

connections. I would shortly draw attention to the following as obvious connections:—

(1.) *As a question of police.*—In consequence of his “insane” individual peculiarity, the insane man may be unable to discharge his duties as a member of the commonwealth. This inability may be more easily recognisable as regards his conduct primarily affecting his own personal welfare and the welfare of his immediate circle. This inability may be more easily recognisable as regards his duties as a citizen of the commonwealth, outside his immediate circle, in his transactions with his fellowmen.

(2.) *As a question of the personal welfare of the man, as a man of “insanely peculiar individuality.”*—It is necessary that those who present themselves as carers of the “insane,” should consider the natural relations of the material existence of man. Every man that he may well-fare through life must duly discipline himself—must train himself to the “better” by means which the relations of life afford; he must develop his individual resources, duly regulate his individual tendencies; he must duly adjudicate upon the value of external influence as a means of education—must estimate and discharge his obligations to his fellows—must estimate the impressions which reach him from his fellows, and which are evolved from them in the course of their life-conduct as individuals or as a community. The “insanely peculiar Individual,” whatever be the nature of his “Insanity,” is one whose organism is such as obviously to embarrass his conduct in these relations. The question in reference to such is—How to dispose the “Insanely peculiar individual” that he may fulfil the requirements of his individuality within wholesome limits; that he may live a man though an “insanely” peculiar man, among fellowmen; and in a community of men, it may be a community of “insane” men, discharge to the extent of his ability the duties of a member of a community. It seems that the insanity of the members of a community does not materially depreciate the training influence of such a community.

(3.) *As a question to the reflective mind.*—“What is in-

sanity?" possesses endless interest: such consideration may help to a clearer view of—The relation of man to his fellows—The relation of man to his own organism—The relation of man to his forbears and descendants.

For convenience sake I have numbered the above queries 1, 2, 3, and would now shortly remark on each.

(1.) "20 and 21 Vict., c. 71.—The Word 'Lunatic' shall mean and include any mad or furious or fatuous Person, or Person so diseased or affected in Mind as to render him unfit in the Opinion of competent Medical Persons to be at large, either as regards his own personal Safety and Conduct or the Safety of the Persons and Property of others, or of the Public."

"25 and 26 Vict., c. 54.—'Lunatic,' when used in the recited Act, shall mean and include every person certified by two medical persons to be a lunatic or insane person, an idiot or a person of unsound mind."

The above may be fairly held as representing what is the general sense of the term "Lunatic" or "Insane person;" these clauses of the Act define the grounds on which a man shall be stamped "insane;" they recognise by omission the impossibility of providing a definite standard of "Sanity;" they recognise that "What is insanity" is a matter of opinion, but ensure as far as possible correctness of opinion in the matter by directing that the question be decided by the unbiassed and independent judgment of two men who by education and training of thought are presumably best fitted to consider evidence in such a matter.

In this relation, (1) the question "What is insanity?" has only to be decided in a certain limited bearing—Is a man's individual peculiarity such as to render it proper that he should be *detained* under care and treatment, that he should be deprived of his rights of citizenship?

(2.) In the second connection, "What is insanity?" Of late great advance has been made in the laborious demonstration of the minute structure of the tissues of the organism in health—of the modification of structure in diseased or disordered states of the organism. By

such research approximations have been made to a comprehension of those recondite changes in elemental structure which more immediately result from the operation of their causes in health—to the modification of such recondite changes which result from certain causes in disease. The *cause* of organic changes in health or disease are alike unknown and unknowable. No knowledge is definite, can reach to the causation of things in the true sense. All scientific knowledge is made up of conclusions drawn from the observation of results and the relation of results; the motive power, the nature of its operations and the variations in its operations are unknown, only the results are recognisable in the present time. Cause of organic action is involved in the mystery of the nature of those vital forces which in their tides promote the growth, maintain the mature vigour, determine the decay of that organism whose life depends upon their vivifying influences.

By research the tendencies of organic changes are to a great extent cleared up, and the relations of organic states demonstrated.

In virtue of knowledge gained by scientific research, insanely peculiar individuals can be placed in conditions the most favourable for recovery from abnormality of organic action. What is infinitely most important, such persons are shielded from an ignorant interference with its inevitable result of hampering those changes, normal and abnormal to the evolution of the organism in which they appear, but necessarily arising as results of modified conditions of the vitality of that organism through which it is necessitated to pass. I quote from Balfour—"Introduction to the Study of Medicine," p. 113. "By modifying these agencies" (the agencies of external nature on the organism) "we are enabled to modify the manifestations of vitality, and as disease is 'the product of the vital actions always taking place within the body,' we are thereby assured that we can modify disease, and we have the clue given us both as to the means to be employed and the mode in which these means may be supposed to act."

It seems that a careful consideration of the action of the organism in health—of the ebb and flow of, and the operation of external influences upon the vital tides, ebb and flow of the vital spring tides, as manifested in constant periodic organic changes, will be of great avail for the proper care and conduct of the “Insane.”

By dint of close observation of the normal actions of “sane” organism—of the exaggerated action of “insane” organism, and the sequence of events in the physiological cycles of such, the observer becomes impressed that in very many instances, not to say the majority of instances, “Insanity” differs from “Sanity,” not in kind but in degree.

From study of such physiological cycles in their different relations—to the tenor of the whole organic life—to external influences—the observer can, in very many instances, foretell the possible occurrence of dangerous results from the uncontrolled manifestation of the organism in “insane” phases of being—can modify such manifestation—can place the individual in such conditions that his organism may most easily transact the “insane phase”—can, even so to speak, often temporise with the “insane” organism till the “insane period” pass without equanimity being seriously disturbed—can, in those cases where the individuality is always of “insane” peculiarity, provide for the transaction of life on terms best for the “insane” man.

The above will, it seems, be found to apply to all forms of “insane” individual peculiarity. Physiology (physis logos)—pathology (pathos logos).—In illustration, merely consider all forms of “insane” peculiarity as divisible into physiological “insanity”—“insanity” resultant in the natural evolution of the organism. Pathological “insanity”—“insanity” resultant from organic state, abnormal to the natural evolution of the organism. Both sets of manifestation result from the same form of action—an impression is received by the organism: by it is more or less correctly presented to the intelligence: by it is more or less sanely adjudicated upon—the adjudication is manifested in the

display of more or less sane action of some sort. The man of "hasty temper," on provocation, displays, more or less, the physiological infirmity of his being. Philip *drunk* adjudicates with less sanity than Philip *sober*. The first is a manifestation of our physiological, the second of our pathological insanity. The mechanism is the same in both. The grounds on which the verdict of "sanity" or "insanity" is decided, are in each identical,—the justness of the action taken by the individual on consideration of impressions received. A constant watchfulness and individual training will alone avail to benefit the natural "Insanity" of the first. A brisk purgative will frequently modify the "Insanity" of the second.

Pathological processes are processes in which unusual influences are brought to bear on the evolutions of ordinary organic life. The abnormality of the influence is manifested by the abnormality of the results given by the organism.

The use of the term "pathological" as a definition of certain organic processes, is in itself a confession of incompetence. Could the nature of a man's organism be grasped as a whole, its pathological action would be seen to form an important part of its life history. Could the requirements of a man's life experience be appreciated, the pathological processes of his organism would be recognised as necessary to his evolution.

To facilitate the care and conduct of those "insane," in regard to whom the question, "What is insanity?" arose in the first connection, lunatic asylums have been erected, originally as the method by which the requirements—safety for the "insane" person—the well-being of the community could most easily be provided for. The duty of the man in charge of such cannot be minutely entered upon here. The term Carer in the following will be used, as a mere term meant to apply to all who are placed in a position of ultimate and personal responsibility for the welfare of the "Insane," within or without the bounds of a special insane community.

It may be said that the most perfect "Sanity" possible to

any given organism can only be enjoyed by that organism when it duly performs its various functions. The carer of the "insane" organism must make the balance of organic health a chief object in his plan for promoting the well-being of these individualities of special peculiarity.

Again, in addition to methods of cure which can be applied to masses, individual "insane" peculiarities—the tendencies to the uncontrolled display of the individual eccentricities of units of the masses demand a special attention. The further duty of the carer of the "insane" is carefully to study the direction of individual tendencies, that he may obviate the ill effects which would arise from the uncontrolled carrying out of such tendencies, yet promote the fulfilling of the individual's instincts within bounds. He must enact the part of sane judgment to many "insane" organisms.

(3.) "What is insanity?" in the third connection. The "insane" man, in consequence of his marked individuality, commands the attention of the reflective mind as regards the relations he bears to his fellows and descendants, to his own organisms, to his forbears. The outlines of the "insanely" peculiar life history are strongly marked and suggestive. Unlike pithily told suggestive stories presented by human faculty, these studies presented by the Divine Maker are suggestive, not of partial truth; but are in virtue of the inherent property of the absolute truth suggestive of such widening and unveiling truth. I would now present three studies of "insane" life, and very shortly remark upon these. I have in the following presented only those in the generation of the "insane" individual, who presented remarkable individual peculiarity.

Study 1.—A—— B——. His maternal great-grandmother—his maternal grandmother—his mother—himself—two sisters and a brother of his mother.

(1.) *Maternal great-grandmother* reported to have been subject to headache.

(2.) *Maternal grandmother* reported to have attained sexual maturity at a very early age (precise age not given); was subject to very severe headaches, which began at

puberty; was subject to bilious attacks. Her menstrual periods were irregular; her disposition was "mild" and "placid." She was a good child and daughter; was aged between twenty-five and thirty when the mother of the "insane" individual was born.

(3.) *The mother of the patient* was the fourth of a group of four children who were older than the rest of the family—a group of daughters. There was nothing remarkable in the maternal history during pregnancy with the individual or at time of birth. She was "a great crier." Had the usual eruptive fevers, but was not very ill.—Had intermittent fever when aged nine; was a well-grown child; had a shockingly bad temper; "was altogether violent."—She reached maturity about the age of thirteen; she consorted with the opposite sex—went astray before she was fifteen, certainly, perhaps sooner; was irregular in her menstrual periods. Had an illegitimate child—the subject of the history—when aged seventeen. She drank, and was very violent when drunk; when drunk, has frequently knocked down and kicked her sister. She was a very handsome and clever girl; was a dancer and singer; was considered by those about her to have "almost the second sight."—She had visions—these commenced when she was aged nine. She has since married, but her family have no knowledge of her present whereabouts.

(4.) Another sister of this group of four (aunt to the "insane individual") is evidently of an extremely excitable temperament.—She considers herself very nervous and easily excited.—When aged nine she sustained an injury of the head; since then she has been subject to headaches and giddiness.—Before her menstrual discharge takes place, or when excited, she suffers much from headaches. "When I am over excited, I lose power, I gasp for breath; I am quite conscious of what is going on, but am not able to speak or move." She dreams constantly; has very vivid dreams. "I have dreamt many things that I have found subsequently come to pass."

(5.) Another sister of this group is rather hysterical.

Another brother of the family, but not of the group of four, had intermittent fever when aged fourteen; since then severe headaches; died of typhus fever.

Insane Individual, aged fourteen. He is a small boy for his age; has lived with his aunt and uncle; was physically a very fine baby. His teething passed easily; had scarlet fever between five and six, from this he entirely recovered; had measles between eight and nine, his nervous system was at this time much shaken. He would wake in a fright. Had gastric fever when aged twelve.—During this fever he slept badly through the night; slept principally through the day, often wandered a good deal on waking, “but was soon brought back.”—He was ill at this time for four months.—He recovered from this fever, but his health remained intermittently feeble. “Always wanted to be brave, but couldn’t.”—Since the gastric fever has always been very nervous.

About a year and a-half after this had been ailing, sometimes with toothache, when he passed through a noteworthy phase of nervous disorder. His aunt, who is a milliner, had gone to her employers, a distance of about a mile and a-half from home, when she was shocked by the appearance of this lad who, *driven by a feeling of terror*, had followed her. He was sent to the country and generously dieted. After a time he seemed to have entirely recovered a healthy equilibrium.

At the present time this lad has displayed an insane peculiarity for the last two months. The symptoms were those of an increased nervous susceptibility.—He became very low spirited, would talk to himself and cry.—He was sleepless; he was very nervous and generally agitated; he complained of giddiness; he became passionate.—When his aunt asked him if he would smile as formerly, he would answer, “How could he smile wi’ all this wrangness here in the way things had gane.—That everything had gane, wrang.” He began to get violent, and throw books at his aunt.—After such outbreaks would run and clutch his aunt round the neck, with “O auntie, auntie, I won’t do so again.

"I'll be a good boy." One night cried in terror that a wheel was revolving inside to tear him from his auntie. After this jumped constantly through the house all day till quite worn out, crying bitterly and talking all the time.

On admission to the Barony Hospital, this lad was in a state of extreme nervous susceptibility; *anxiously* obedient to the slightest word; wanted to get back to school; acted and talked suddenly. He gradually settled down; the presence of the other patients in the ward seemed to steady him; but still the impressibility of his temperament displayed itself in his conduct. He grew restless and excitable as the visiting day came round, in expectation of his aunt's appearance. To give the proper value to the foregoing bit of history, I must add that the boy's aunt, who gave me these facts, assured me that there was nothing noteworthy in the other blood-connections of the lad; the boy's father was commonplace.

The facts of this piece of family history, as appearing to me, I would express as follows:—

Headache in the maternal great-grandmother is the first evidence of a tendency to abnormal nervous states. Headache is an ordinary form of nervous disorder. The real cause, even the mechanism so to speak, of the sensation pain is unknown. The relation of the abnormality pain to the normality painlessness is unknown. But some painless sensations by intensification become painful. This seems true as regards the effect of impressions of all kinds. Many sensations seem translatable into each other.

Headaches in the maternal grandmother occurring at the time of puberty and coincident with a precocious puberty—a peculiarity in the sexual part of the organism with a tendency to abnormal nervous states obtains in the succeeding generation in the family series. The nature of the relationship of the nervous system to the organic completeness of the parts of the organism is unknown. The real cause of the frequently recurring nervous disorder on reaching sexual maturity is unknown.

No evidence is afforded in the above of that excito-motory

irritability, shown in the following history of their descendants.

In the history of the *Mother* and *Aunt* of the insane individual, abnormality of action was displayed through a greater range.

The History of the Mother.—It is very difficult to come at a proper view of the relation of the matter contained in the foregoing history. The facts recorded present the conduct of a fervidly susceptible organism, which, under due rule, might have been the exponent of a lovely personality; the due rule was wanting, and this page of history to our present perception affords but the idea of the little controlled action of a vitalised organ. Of the true meaning of the facts of this life history, of the true relations of this woman to her organism we cannot judge; we have not in the foregoing, it seems to me, even a hint. "She was altogether violent," says her sister. There is not I think evidence of deliberate and thought-out badness of conduct. The great feature of her personality is an extraordinary sensual sensitiveness and an uncontrolled display of its excito-motory results, in which the whole nervo-mental machinery shared; over which the individual exercised little control. She was the sport of her own vitalised organism.

The Aunt.—A careful consideration of the facts presented in the foregoing, concerning this member of the family, suggests the idea of an organism in parts equally impressible with that of the mother—an organism of less fully developed vital energy—more, though still very partially, under the guiding powers of its possessor. In the case of this individual, insane peculiarities seemed in great measure connected with the sexual part of the organism. When her weak organism was over stimulated she lost motive power, could not speak nor move, but control over the higher nervous processes remained unaffected.

The Insane Individual.—History gives evidence of originally fair general organic health, with, however, a tendency to the display of irritability of the nervous system when the general action of the organism was at all hampered. One

very note-worthy feature in this lad's conduct is that, in addition to the nervous irritability and impressibility of his forbears, he manifested a passionate repentance for his passionate wrong-doing. After the outburst of rage came an outburst of sorrow for his rage. But as far as can be gathered from the account of him, his general character was not strengthened by the recognition by him of his wrong-doing. The poor lad could not judge of the nature and extent of his culpability. Again in his melancholy and his "how could he smile wi' a' this wrangness in the way things had gane," one sees a sensibility which required a more powerful individuality to exact from it a right life conduct.

Study 2.—C. D. Paternal grandfather—father—mother—patient.

Paternal Grandfather drank hard, but was a very clever workman. He was employed upon Corporation work in Edinburgh.

Father was a cabinetmaker, and a very clever workman, but drank hard. He died of heart complaint very suddenly. He was about 30 when C. D. was born. He was sometime separated from his wife. He was the victim of numerous delusions, but was in great demand as a workman, and was the foreman in a large firm of cabinetmakers in Glasgow.

Mother is a dipsomaniac apparently, as also the two sisters; she has sold all their property, and spent the proceeds in drink. The sister who has been seen is of very violent temperament, to say the least.

Patient, aged 41. A brother was a dipsomaniac. Is described by his wife as "Quick-tempered, but not bad-hearted." The present is described as the second attack, but it is probably merely the outcome of the evolution of a natural temperament, as he is said by relatives of the family to be very like his father. The first suspicions of "insanity" were grounded on his manifestations of unfounded suspicion.—"He was under conversion, and was in a very bad state of mind."—Imagined people were hurting him, and giving him a bad spirit. Again, after marriage, on the occasion of what was held his second attack, he

imagined his wife was unfaithful to him.—He used to strike his wife.

On admission he was in a state of great mental irritability—he had been preaching in the street, and disturbing the public peace. In the airing court of the asylum he would preach; on being reasoned with he would desist, but would very shortly recommence; and, when remonstrated with, would answer to the purpose that he was bound to preach. He was constantly pestering (I don't know a more expressive word) to be allowed to go out. After a time the mental and nervous irritability in a great measure subsided, and he was liberated on pass. He was soon in full employment, and did his work to the satisfaction of his employers; he was never short of work. He quarrelled with his wife, separated from her, and went to live with his mother and sisters—they drank and sold the furniture. He was wretched there. He annoyed various persons with his suspicions concerning them. His demeanour and mental manifestations were in fact extraordinary; but he did his work excellently, and never wanted for employment. Finally, his abnormality of conduct became so marked as to necessitate his return to the asylum for a period.

The above is a history where individual peculiarity was of a decidedly "insane" pitch. There was no lack of cleverness, but lack of power to manage the cleverness. Grandfather, father, son, were all excellent workmen—had all suprasensitive organisms, but had little power to evolve right conduct from the vivid impressions constantly received by them. In the son one state of mind would succeed another, each equally vivid, equally transitory, with equal tendency to the taking of some immediate *undeliberated* action.

This bit of history is valuable as being a good instance to the point that insane individual peculiarity does not preclude possession of special ability. Nay, it may be said that in virtue of that impressibility and a quickness of reflecting such impressibility into action, excellence such as that of C. D. and his family consists. The unhealthy individual peculiarity of such appears when called upon to deliberate

on matters requiring grave consideration, or to engage in mental efforts for prolonged periods.

Study 3.—E. H. Father of patient—mother—sisters—patient.

Father of patient was a clockmaker. He would keep steadily at work for five or six months, when he would take a regular drinking bout, and for a time entirely neglected his work.—He was easily affected by drink.—He was not excited, but simply succumbed to its influence. This man was transported for stealing watches, and died in Australia, aged 70. Was not epileptic.

Mother was asthmatic for twenty years. She was aged 40 when she died.

One sister was asthmatic, and died of erysipelas.

Another sister died of phthisis pulmonalis.

Patient is saturated with scrofula. He was by trade an iron rivetter. He began to drink when aged 18, and became such a drunkard, that he sold all his clothes, and lived in squalor to enable him to buy drink.—The uncle with whom he went to work drank.—The patient was brought up in a drunken neighbourhood.—He used to work hard. He began to take fits when aged about 25.—He himself thought drink brought on this. He describes himself as having always been of quick temper, “awa’ in a minute.” He was, in his younger days, in the habit of taking active exercise, and was fond of music. When first admitted to the Barony Asylum he used to take fits once a fortnight or so, he then got better, and was able to work. For some time past, five or six months, he has been confined to bed on account of suppurating glands, and the fits have been less frequent, but quite lately they returned with renewed severity. He stated that he used to see visions—angels—and mistook the identity of persons.

The history of the above differs from the two foregoing. He was of the tubercular cachexy. Now the term “tubercular cachexy” may be explained as intended to convey a certain peculiarity in the carrying on of the vital processes of an organism, in consequence of which, there is a tendency to

the formation of organic products generally considered of a lower type than those found in non-tubercular persons. In such persons there is found an irritability of organisation. This sometimes affects all parts of the organisms; sometimes it affects only special parts. Individuals of this peculiarity frequently manifest great mental irritability;—they are quick-tempered, peevish; they possess great sensitiveness.

Persons of this organisation are liable to be affected with febrile or inflammatory diseases; their organisms are liable under certain external influences to run into highly excited states of vital change, in which in some cases waste of tissue takes place which is not replaced by tissue of the original vigour.

In the above history the facts seem as follows:—

The father was a good workman, but was a true dipsomaniac. He manifested himself at periodical intervals as of “insane” individual peculiarity. He also stole watches.

The mother was asthmatic, of inferior nervous constitution.

A sister died of tubercle in the lung.

The patient gave evidence of the tubercular constitution by glandular disease; in irritability of temper, “awa’ in a minute;” in general susceptibility. He was a drunkard like his father. He took epileptic fits, and saw visions of angels, etc.

I think a careful consideration of the above will urge the belief of an individual endowed with an extremely susceptible organism derived from his parents—or rather in the natural development of an organism so begotten; its powers were subjected to no influence which could assist him in the elaboration of a right life conduct for himself. Indeed, it may be questioned if this man under any influences could have conducted himself in a manner, “sane” when reviewed by the judgment of his fellows, such was the organic peculiarity inherited by him.

In the early part of this paper I made some remarks as

to three connections in which the question "What is Insanity?" is found to arise. I proposed viewing "insanity" in this *unnatural* way in the hope of gaining in clearness of view by an artificial method of erecting these three inspection-heights,—points of observation.

I would now, as shortly as possible, review the just given life-histories in these three connections.

1. "What is Insanity" in the first connection? From a police point of view.

A. B.—The individual peculiarity of the ancestors was not such as to raise the question of "insanity" in the first connection. The individual peculiarity of A. B. has not yet reached such a pitch as to raise the question of "insanity" in the first connection. Those about him have been able to do with him. His personal welfare did not necessitate the taking of special methods as regards his personal disposal. He was treated in the ordinary wards of the Barony Hospital. He was much liked by his fellow-inmates. He derived benefit from their society.

C. D.—His *Paternal Grandfather*.—The question did not arise in the first connection in regard to this individual in the hereditary line in which C. D. appeared an "insanely" peculiar member.

Father had more than once to be separated from his wife. I fancy the question was more than once raised in the first connection amongst his immediate relatives. But he was borne with on account of his excellent ability as a workman.

Patient.—The question was raised in the first connection in regard to this man, and practically answered to the effect, that though possessed of eminent ability of a special sort (as a wood carver) and in so far fitted to rank high among his fellows—his individual peculiarity was otherwise of "insane" pitch and quality, such as to render it impossible for others to carry on the ordinary relations of life with him.

E. F.—*Father*.—The question in the first connection was not raised in regard to this individual as a question of

"Insanity," but as a question of "Vice." On account of what may be called in this connection "Vice," his conduct became a question of police, he was transported for stealing watches intrusted to his care in the discharge of his business.

Patient, as an "insane" individual, was secluded from the business of the commonwealth, it was necessary both for his own welfare and the welfare of the public that he should be so secluded.

2. In the second connection as a question of the personal welfare of the man, as a man of "insane," peculiar individuality, I have nothing to add further than has already been said. The question of the welfare of the "insane" does not seem so much a question for writing about as for solving by personal effort. I merely repeat here that the chief questions to be studied by the carer of the "insane" are, how to best provide for the organic health of the "insane" man, and "insane" community of men under charge; how to allow a due licence to the diversities of individual character, yet keep within due bounds the tendency to "insane" extravagance in the action of the insane organism. The "Insane" are deficient in ability to play the part of citizens of the Commonwealth.—How to manage that for them, also, the undefined but powerful influence of a social life may be provided, the form and manner being adapted to the special requirements of men of abnormal individual peculiarity.

3. In the third connection—"What is insanity?"—The insane man commands attention as regards the relation he bears—To his fellows—To himself—To his own organism—To his forbears and descendants.

The "insane" man as regards his fellows.—There is an obligation laid on every man by the fact of his being in life at all, to make the best of himself, to use his relation with external things recognised through his organism, for his self-culture. In the self-conduct evolved by him in the course of his training he, insensibly it may be, but widely, influences the self-training of his fellows. He, to a certain extent, supplies material by which they carry out their self-culture,

while forming those conclusions in virtue of which they regulate their life conduct. Perhaps the most inexhaustible field whence wisdom can be gained lies open to the use of every man in the ordinary goings-on of mankind. For mere convenience, all that a man can know may be described as coming from two sources.—From the Maker of mankind to each man according to his needs and his capacity for receiving it. All that a man can receive from this source is absolutely good and available at once as a rule of conduct.—From a consideration of the on-goings of his fellow-men; from a study of the utterances of his specially commissioned fellow-men.

A study of family history seems to point to the conclusion that "insanity" arises by the exaggeration of individual peculiarity through periods of time of longer or shorter duration, through generations, through the time of a single life's history, to the pitch of insane individual peculiarity.

A study of the relations of individual peculiarity as manifested by those of our own generation, will impress the belief that, as regards "insanity," the outcome of the natural evolution of the organism, it is a question of degree of peculiarity of organism, not of difference. As I have ventured to say elsewhere, insane individual peculiarity may be viewed as the apex of a pyramid with a broad base of sanity which culminates gradually through different degrees of individual peculiarity in an apex of insane peculiarity, and I believe this would be found true as regards all forms of insanity—it is a matter of gradation from the ordinary to the extraordinary. Now, as in judging of the relations of a brick in the pyramid, we would not choose either the top-most on three-sides isolated brick, or the bottom brick with free side stuck face downward in the mud, so in estimating the nature of the relations of an individual member of the human pyramid, we would take specimens from layers at various elevations.

Take a brick of the lower round of ordinary individuality. This member, as did his ancestors, as do his compeers, the

majority of the human race, as will do in all probability his descendants, solidly and with ordinary, but not extraordinary fitness transacts the business of his lifetime; with tendencies, no doubt, of individual character, but with no marked distinguishing traits of any kind.

As we ascend gradually we come on those who in virtue of the balance of their character are of eminence in the community of their fellows. But whose individual peculiarity consists more in a fervid energy in carrying out their designs,—of men who have the business talent.

Selecting a member higher up in the gradation we recognise the man of special individual peculiarity—the specially gifted soul in the specially adapted organism, a Luther it may be, a Peter the Great, a Dr Johnson. The specially commissioned men.

The more individually peculiar a man is, the fewer points of contact will he have with his fellows. Such a man will be more or less isolated. He may be isolated with the isolation of the specially gifted peculiar man—wondered at by his fellows, regarded with admiration, adoration, or fear by them. He may be isolated with the isolation of the “insanely” peculiar individual, separated openly from the commonwealth for his own safety and welfare, or the welfare of others. Though a special individual peculiarity may be a special excellence, its possession always, as far as the operation of the peculiarity goes, has the primary effect of isolating the individual from the community of his fellows, of leading to a more or less of looking askance at him by them; afterwards his peculiar excellence may bind the masses to the individual as to their Leader, Prophet, Master; but the first effect of the manifestation of individual peculiarity is isolation. When its possessor has disciplined himself to the fulfilment of his intended relation to his fellows—his peculiar—his true relation to his fellows, then that relation can be recognised and valued by them. If the possessor of individual peculiarity cannot discipline his peculiarity in any relation to his fellows, he continues, more or less, completely isolated from the life-conduct of his fellows—he

stands in an "insane" relation to the life-conduct of the community.

Again, from near the pinnacle of our illustrative pyramid we take a constituent of "insane" individual peculiarity: a man it may be of special endowment, but whose individual peculiarity is such—of such a pitch as in great measure to separate him from ordinary community with his fellows. I do not say that consciously the "insane" man is a man of isolated position, but that will be found the practical outcome if he be of eccentricity so marked as to gain him the verdict of "insane."

To his own Organism.—As regards the question of the relation of the organism "sane" or "insane" to the need of its possessor—to the education of its possessor—as regards the question of those requirements in his progress which the possession of his individually adapted organism meets,—these things are beyond *demonstration*, but not beyond inquiring into: a man in searching into himself, and reviewing the stages in his own life-conduct in the times passed from him, can, from and in virtue of experience, look with confidence to a meeting of his requirements in time to come—can look with confidence on the struggle of his fellows, "sane" or "insane" in the life battle of which he also is partaker, and has individual experience. He becomes convinced that not only are the means of training himself to the "better" provided for him, through the operation of an organism of given capacity, but, as these means are judiciously or injudiciously used by him for the attainment of the great end of his being, in reaching forward to that "better," so in wonderful concordant process does that mortal organism gain in power for the fulfilment of its ministry through time, in the development of his immortal self. He can see by the study of insanelly exaggerated individualities, with comparative clearness, but yet dimly, that much of what might be by the slight observer held as wickedness of the man, is wickedness of his vitalised organism, and may be, in fact, the out-come of a phase in the training of the man himself to greater capacity for greater good. The man who want

really to gain some idea of what is insanity—what does insanity mean—must get rid of the idea of the insane man as an outcast from the brotherhood of mankind. He must not thank God that he is not even as this lunatic. He must cease to think of cases of monomania, of epileptic insanity, of dementia, &c. He must cease to think of men as *cases* in fact. He must think of the insane man as his fellow-man, in whom ordinary peculiarity of individuality is such as to render him a man heavy-laden, but, like himself, passing through a phase of his being, doubtless under conditions the best fitted for the purpose of his being at all. Much is spoken of “insane” delusions, of “insane” actions, of “insane” passions, of “insane” pride, of “insane” melancholy, but does the fluent psychologist habitually so correctly appreciate the multitude of impressions which reach himself—so exactly adapt his actions to the requirements of the occasion—so wisely restrain the promptings of his natural desires—so constantly recognise his true relation to his own so-called successful achievements as to eradicate the insanity of pride—so train himself that the gnawings of a weary hopelessness can never reach him—has he never, in a prostration consequent upon severe illness, experienced hallucinations of sight and hearing, and a diminution of the ordinary vigour of his intellectual force? If he has no experience of these things, then might he say to the “insane” man, “With thee I have no sympathy;” but truly, in so saying, he would acknowledge the brotherhood which he seeks to deny, and suggest the supposition that his “sanity” depended alone upon obtuseness of perceptive faculty, not upon superior ability to wisely order the conduct of an organism adapted to the needs of individual superiority.

“What is insanity?” A term used to express the state of a brother heavily laden in the weary life battle—sent forth to bear the burden and heat of a day more fervid than common. It may be, by means of organic modifications, set aside from a participation in the ongoings of his fellows, which participation might be of irretrievable harm to him or them.

"But," one would say, "a whole lifetime *thrown away!*" What do *we* know of times and seasons, or the *uses* of the different lots of mankind?

A very few words on the organic conditions connected with the display of insane individual peculiarities. These conditions, for clearness of view, may be described as dependent upon the operation of influences extrinsic or intrinsic to the organism, hereditary or acquired, by the individual. It may be said with truth, that all "insane" individual peculiarity of conduct is, with few exceptions, dependent upon hereditary predisposition. The exceptions in which insanity is dependent upon influences extrinsic to the organism are either entirely distinct and sharply defined, or are merely exaggeration to the "insane" pitch of inherited peculiarity, more or less well marked. In this last variety it may be held that the work of influences, which usually operate through generations, is compressed into the lifetime of a single individual.

Finally, as regards the relation of the insane individual to his organism, it may be said that what we observe as regards the relation of the "sane" man to his "sane" organism, to that sane organism in the swing of its healthy action—in the modification of its action in the temporary disordered state—we notice, in an exaggerated form, as regards the relation of the "insane" man to his "insane" organism, the difference is one of degree only. Thus far we may hold that, as the temporary insanity of a passionate disposition, or of a passing disordered state, may occur, as part of the wise ordering of the life discipline of the creature, by the Creator and Sustainer of his being, so those organic conditions which lead to more or less constant excitability of the brain—those organic disorders, more or less constant, which occasion constant individual peculiarity of conduct of "insane" pitch, may equally serve the true interests of our "insane" brother, who is, with us, equally the object of regard to Him who is Omniscience and Beneficence, and to whom time is not time as we his creatures can alone comprehend it.

The "insane" man, in regard to his ancestors and descendants, to the succession of groups of beings in which he appears.—I would direct in this regard attention solely to the first of the life studies—the history of A—— B——. The salient points of individuality have been given of one of the maternal great-grandmother—the maternal grandmother—the mother's sister—the "insane individual." In all is found a tendency to the manifestation of abnormality of organic action, as displayed in certain results. In all the action of the nervous system was prominently abnormal. In the four women was displayed a precocity in the development of sexual maturity, accompanied in the maternal great-grandmother and grandmother by the abnormality of pain. In the mother the same sexual precocity; but, unlike her forbears, the tendency to nervous abnormality was displayed, not in pain but in an intense nervous sensual susceptibility, in which the whole organism seconded. Impressions rapidly and vividly affected her, and were easily rendered into correspondent action. I do not say wise action was taken on these impressions, only correspondent acting resulted. Her organism seemed beyond her power for wise direction. She was not even conscious of her true relation to her organic life.

The Insane Individual.—This lad inherited the nervous susceptibility of his ancestry. But he did not possess the organic robustness of his mother. His organism had not such healthy correspondence as would enable him to carry out the dicta of his judgment on the impression received through it by him.

In the above series of four we have, I would suggest, the points of a gradual organic potentiality for the "better." The great-grandmother and grandmother, it is true, gave no cause of offence to their fellows in their life conduct; but they were not visited by such a wide experience as their daughter or her son. Their daughter was possessed of magnificent organic development, but evolved nothing but "wickedness" from it. Her son, the "insane individual," tried to be good and brave; he could at least recognise

somewhat of the obligation of things, and endeavoured to order his conduct in the light of these obligations to deal rightly with some at least of the impressions which vividly reached him.

This life is only a phase of our being—a stage in progress. One may hope by study of the successive events of life history to gain some hint of the meaning of sequences such as the above three studies afford. One may see dimly that there may be an organic relationship and a spiritual relationship in the families of mankind; that modifications of parental organism may be displayed in the manifestation of vice in the child, of insanity in the grand-child; that the capacity for so-called “vice” and “insanity” being organically unavoidable by the possessor of an hereditary transmitted organism may be a stage in the fitting of its possessor for “better.” That the hereditary organic modifications and developments which lead to such “insane” and “vicious” manifestations are adapted to the true requirements of families of men; who as the possessors of organism, of instruments of training so moulded, are sacredly bound to those from whom they receive them, through whose agonies such instruments are tempered; to those for whom they in turn help to weave the earthly garment.

What we may call the spiritual relationship of man to his blood relations may be gained some idea of by considering those strange resemblances which lead one to say of a man—“He is his father or grandfather over again,”—these resemblances not merely in turns of action, but in modes of conduct and general dispositions.

The *Relationship* of men is seen in these resemblances.

The *Individuality* of the man is displayed in difference of disposition. Resemblance and difference combined are manifestations of the Individual mortal man—who derives the organism by which he manifests himself from an ancestry of like mortals which loses itself in the mist of ages past—of man, the result of whose life conduct to a certain extent determines the form in which his descendants shall see, act, and be seen in their turn.

In conclusion.—The great lesson, I would say, as concerns "Insanity" is—That the "insane" man is not a monstrosity in creation; that the "insane" organism is evolved in the same manner, by the same process of natural cause and effect, as the "sane" organism. That we can dimly perceive though we cannot comprehend that it is possible that an insane organism may minister to the real good of its possessor. As aid to this belief we must keep in view the fact that we look upon these things not in their entirety, we only see that part of the truth of them which present intelligence can grasp. We must remember that, whatever of the processes of creation, whatever of the phenomena of spirit existent in flesh we can know and name, is in that naming by a partial intelligence stamped as partial truth—that God's truth is beyond conception. But as we train ourselves more and more to receive it, so more and more in ways suited to individual forms of capacity will truth be revealed.

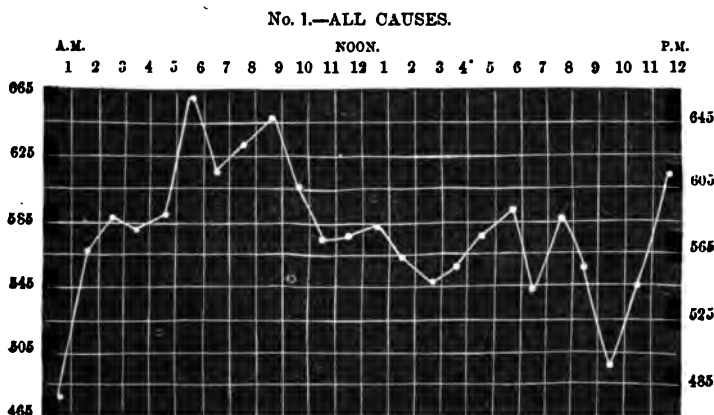
No man, however "insane" his individuality, is in fact quite isolated from his fellows. Let the pitch of insanity be what it may, still, on one side he is in contact with the brotherhood of man—he has had a father and mother, and from them has derived an organism moulded through generations by the infinite struggles of innumerable men who have all unconsciously, among other results, helped to mould the potentiality for the appearance this "insane man" makes in the present time. He spends his existence surrounded by conditions, which for their existence depend upon the outcome of the adjudication, more or less sane, of countless individuals on the things they had in their time eyes to see and ears to hear. He may be surrounded by conditions of life, the result of the opinion of his fellows on the relations, rights, and requirements of the "insane" man.

II.—ON THE HOURS OF MAXIMUM MORTALITY IN ACUTE AND CHRONIC DISEASES.

By JAMES FINLAYSON, M.D., *Glasgow*.

"BURDACH states that the greatest mortality of diseases "occurs after midnight. My results for fever are decidedly "opposed to this, as they give for the greatest number of "deaths the hours from noon to 6 P.M." Such was the statement of the late Dr And. Anderson, of Glasgow, in a paper on Fever, published in 1840. The object of the present communication is (1) to show that the results from *fever* statistics do, in point of fact, differ from those obtained from the *general* mortality returns, or from those of *chronic* diseases; (2) to indicate reasons why such a difference should exist; and (3) to illustrate the subject by a comparison of the statistics drawn from Glasgow sources with those obtained elsewhere.

Mr West Watson, the City Chamberlain, tabulated the whole deaths (some 13,000) occurring in Glasgow in 1865, according to the hours at which they were reported to the registrars as having taken place. On reducing his



observations to the form of a curve, we find three noteworthy facts. (a) A marked difference between the terminal hours of the day, viz., between 11 to 12 P.M., and 12 P.M. to

1 A.M.; (b) a maximum gradually reached and consistently maintained, from 4 to 10 A.M.; and (c) a very slight tendency to elevation in the afternoon hours.

(a) The immense difference between the number of deaths from 11 to 12 P.M., as compared with those of the succeeding hour, from 12 P.M. to 1 A.M., can scarcely represent any actual fact in nature: as I suggested in a paper recently read before the Glasgow Philosophical Society, the difference seems to arise from the peculiarity of these two hours forming the boundary line which separates one day from another. Curiously enough, an exactly similar perturbation occurs in Schneider's larger tabulation of 57,000 deaths in Berlin. (See Appendix.) But in the curve No. 2, in the present paper, representing the deaths from chronic disease as obtained from the Town's Hospital records, while there is a great disparity between the two hours in question, the excess in this case is on the different side. The only explanation which occurs to me is, that the public might, perhaps, incline to put cases occurring at this doubtful time within the day on which they had been watching for the fatal event, while the officials at a workhouse might be supposed to prefer to return such ambiguous cases for the fresh day on which, as night nurses, they were entering. However this may be, the existence of the perturbation in the Town's Hospital curve, with such a complete reversal of the distribution of the figures, seems to leave no doubt of the terminal perturbations being due to extraneous causes.

(b) The maximum mortality from 4 to 10 A.M. in Watson's Glasgow table, agrees essentially with Schneider's maximum for Berlin, although by the latter it is made to fall about an hour earlier.

The beginning of this period corresponds, as I have elsewhere shown, with the minimum attained by the pulse, temperature, and urinary excretion in their daily range. From this hour the range of these important functions begins to increase, so as to reach a maximum in the course of the day. "Hence, we may either say that the period of minimum vital energy, which exists during the first few hours after

midnight, being deepened and perhaps prolonged, coincides with the summit of the death curve; or, phrasing it otherwise, that the time having arrived for a fresh rallying of the vital energies for a new day, the dying are found to be unable to respond to the call, and so they perish in greatest numbers at the very hours in which the living are manifesting, in every way, a renewed vigour."*

(c) In addition to the great maximum in the morning, there is, perhaps, a slight tendency to an increase in the afternoon or evening hours—4 to 8 P.M.—shown both by Watson's and Schneider's figures. This feature may be due to the disturbing influence of acute diseases on the general mortality as will be explained hereafter.

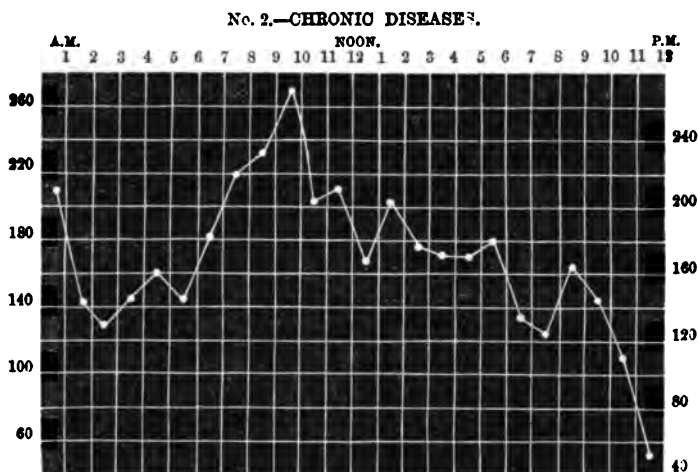
	PROPORTION PER 1000.					
	A.M.		NOON.		P.M.	
	12-4	4-8	8-12	12-4	4-8	8-12
Watson—13,854 Deaths,.....	159	180	174	162	166	159
Schneider—57,984 Deaths,.....	169	191	169	152	163	157

CHRONIC DISEASES.

The mortality from chronic disorders must follow the law of the general mortality, inasmuch as death usually occurs from chronic disease. In such cases, also, the daily period of depression in the vital functions, already referred to, must have a less complicated sphere for its operation. To study such cases, I obtained the records of the Town's Hospital for the poor of the city. If children under 10 years be excluded, nearly all the deaths in this institution are due to chronic disease. In the Appendix there is a list of the diseases in 100 deaths impartially selected over the whole records. This list shows that 95 per cent. of the deaths were due to chronic diseases; there was, indeed, an unusually large number of cases of very old people dying from senile decay, so that (children under 10 being excluded) the average age at death was 51 years. An excellent selection of chronic cases was thus found ready made; all the deaths, except those under 10 years of age,

* On some indications of a daily periodicity in the vital functions of man. By James Finlayson, M.D.—*Proceedings of the Glasgow Philosophical Society, 1873-74.*

were included in the table. The curve shows in addition to the perturbation in the first and the last hours of the day already discussed, a single maximum of a very marked character occurring in the forenoon, and falling, perhaps, somewhat later than in the case of the deaths from all causes.



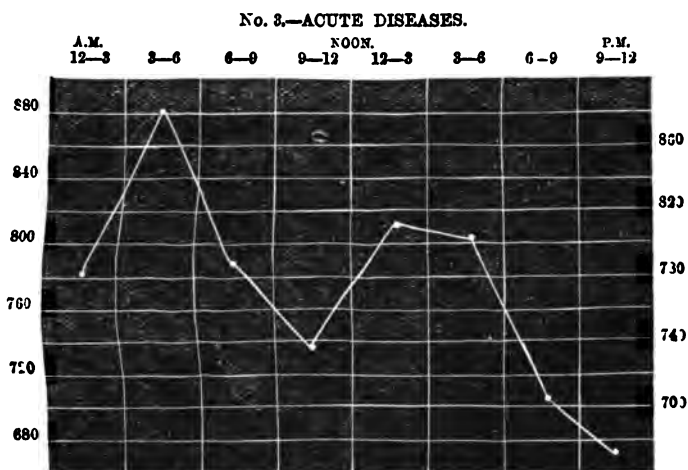
To test the accuracy of this conclusion, 1077 deaths from phthisis pulmonalis were tabulated separately. This affection was selected as a typical chronic disease. 814 of these cases were from the Town's Hospital, and 263 from the Royal Infirmary records. The correspondence of the results is perfectly satisfactory.

	PROPORTION PER 1000.					
	A.M. 12-4	4-8	NOON. 8-12	12-4	4-8	P.M. 8-12
4045 Deaths in Town's Hospital representing Chronic Diseases,	156	174	226	176	151	117
1077 Deaths from Phthisis Pul- monalis,	162	182	223	176	152	105

ACUTE DISEASES.

Acute diseases are well represented by that great class of cases treated in the fever wards of our Infirmary and in the Fever Hospitals of the city. The disorders thus included consist chiefly of typhus, enteric, and relapsing fevers, smallpox, scarlatina, and measles, with a few cases

of other infectious diseases, and a small proportion of disorders admitted by mistake—chiefly pneumonia and pleuropneumonia, acute cerebral affections, and obscure suppurations. A tabulation of 6183 deaths in such cases shows the mortality to present a double elevation in the course of the twenty-four hours—one in the early morning, and another in the afternoon or evening. When reduced to periods of three hours, so as to abolish minor fluctuations, the curve brings this double maximum clearly into view.



But to those who are not familiar with the practice of our fever wards and hospitals in Glasgow, it may be more satisfactory to have smaller numbers made up of definitely ascertained and well-known diseases. 1487 deaths from typhus, enteric, and relapsing fevers, smallpox, scarlatina, and measles, show likewise a double maximum for the twenty-four hours.

	PROPORTION PER 1000.					
	A.M. 12-4	4-3	NOON 8-12	12-4	4-3	P.M. 8-12
1487 Deaths from Typhus, Enteric and Relapsing Fevers, Small-pox, Measles, Scarlatina (see Appendix),	162	180	170	164	177	147

But, further, in the case of Glasgow, typhus (exanthematic) was selected as the typical acute disease, and as the

diagnosis in the deaths thus tabulated was made at the City Fever Hospitals, it may be relied on with confidence. In 828 deaths from this disease there is not merely a second maximum, but the proportion of deaths from 4 to 8 P.M. exceeds that of any other period of 4 hours.

	PROPORTION PER 1000.					
	A.M. 12-4	4-8	NOON 8-12 12-4		4-8	P.M. 8-12
828 Deaths from Typhus,	156	176	169	150	188	161

In acute diseases the elevation of the mortality in the early morning comes under the explanation already given with regard to the general mortality; "For," as Dr Murchison says in his *Treatise on Fever*, "it is usually in the early morning that the vital processes are at the lowest ebb." But the second elevation of the mortality in acute diseases, traceable in the afternoon or evening, is no doubt related to the exacerbations of the fever which so generally occur after mid-day. Dr J. B. Russell regarded 8 P.M. as usually concurring with the maximum of the daily exacerbation of the temperature in typhus (*Glasgow Medical Journal*, vol. I., p. 495.) But in severe cases, and *a fortiori* in those which prove fatal, the tendency is for the maximum to occur sooner, and, what is more important, for the exacerbations to begin earlier in the day (*Wunderlich, Medical Thermometry*, X. 7.) Any time in the afternoon or evening would thus accord well with thermometrical investigations, and the figures represent the second maximum of the mortality in febrile diseases as occurring sometime after noon and before 8 P.M.

Thus far a study of my own statistics led me, when I found that the researches of others, especially those of Berlinski and Casper and of Schneider, had conducted them to substantially the same results as regards the main facts here adduced, and to somewhat similar opinions as regards the explanation. The former writers seem to have refined to the extent of separating the inflammations of important organs from the class of fevers. They thought the maximum mortality from inflammations occurred earlier in the day than in the case of fevers—the direct damage to vital

organs terminating life in the one class, exhaustion after the exacerbation determining the death in the other class. The figures hitherto compiled do not seem to warrant such an opinion, but those founded on by Berlinski and Casper, and the returns of Schneider, as well as my own, will be found in the Appendix.

With the exception of the figures supplied by Dr Steele at Guy's Hospital, but few observations have been published on the hour of death in this country. Dr Steele's conclusion was rather against any influence being exercised by the time of day in this respect; but in Guy's Hospital the large proportion of acute cases might tend to mask the law of the general mortality; indeed, his proportions for periods of six hours, as given in the Appendix, seem to agree with the double elevation already described as found in acute diseases.

So far as this inquiry can be said to have a practical application, it lies on the surface. Not unfrequently our sole indication for treatment is to try to avert impending death; a knowledge of the time when the tendency to death is greatest may serve to direct special attention to these critical hours. In particular, it is worthy of note that death from exhaustion seems specially apt to occur in the early morning—a time when the tired attendants, unless forewarned, are not unlikely to be less alert. The question of life or death—affecting it may be a case where recovery is perfectly possible—sometimes turns upon attention to the timely supply of food or stimulants in accordance with the necessities of the patient, and the statistics submitted furnish an indication and warning intelligible alike to the popular and the professional mind.

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SOURCES OF PRESENT STATISTICS.

My friend, Dr J. B. Russell, Medical Officer of Health for Glasgow, kindly placed at my disposal the books containing the hours of death in the two fever hospitals of the city (Parliamentary Road and Belvidere).

He likewise obtained for me, through the kindness of the authorities, similar records from the Town's Hospital for the poor of the city.

Dr Thomas, the superintendent of the Glasgow Royal Infirmary, placed the records of mortality in that institution at my command.

Dr Samson Gemmell and Dr James Barr gave much time in co-operating with me for the tabulation of these extensive materials. Deaths entered as occurring at 12 P.M. were tabulated as between 11 and 12. All indistinct records were passed over.

ACUTE DISEASES.

TOTAL	A.M.												MOON.												P.M.			
	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12				
Deaths in Fever Wards and Small-pox Wards of the Glasgow Royal Infirmary, 1848-1864, ...	109	137	114	147	141	133	137	109	130	101	106	96	152	123	136	123	141	109	116	104	73	92	107	94				
Deaths in Fever Wards (apart from Smallpox Wards), 1864-1873, ...	82	73	90	78	83	84	82	69	92	72	84	67	84	73	85	73	71	71	81	71	73	71	74	56				
Deaths in Smallpox Wards 1864-73, ...	10	6	3	7	7	7	7	7	1	1	2	3	1	1	2	1	1	3	1	2	2	3	1	3				
Deaths in Parliamentary Road Fever and Smallpox Hospital since founded, ...	45	41	45	57	54	51	43	41	41	57	52	55	34	43	59	50	54	58	47	65	43	59	40	46				
Deaths in Belvidere Fever Hospital since founded, ...	10	11	10	12	6	13	9	12	9	6	19	16	11	7	12	15	18	15	8	12	8	8	11	4				
6183	256	268	263	301	291	283	278	238	273	237	263	237	282	247	264	263	285	256	253	264	199	233	233	303				
Deaths from Typhus Fever, ...	828	27	30	42	47	37	31	31	30	38	37	35	21	33	37	33	42	36	34	44	39	43	27	34				
Deaths from Enteric Fever, ...	79	3	2	4	3	1	4	3	2	2	5	2	4	1	4	6	7	4	3	1	2	7	3	2				
Deaths from Relapsing Fever, ...	69	2	3	1	5	0	5	2	3	4	1	3	4	5	3	3	2	2	4	0	5	2	5	3				
Deaths from Smallpox, ...	288	18	11	10	15	17	14	19	9	11	11	10	9	8	11	15	11	15	9	15	12	8	5	10				
Deaths from Scarlatina, ...	41	3	2	1	1	3	1	0	1	1	1	3	5	0	2	2	1	2	3	1	5	2	0	0				
Deaths from Measles, ...	182	7	4	7	9	6	11	7	6	15	14	8	6	14	7	10	9	8	6	10	1	8	5	1				
1487	60	52	53	76	72	74	69	62	61	67	65	60	58	52	67	67	71	67	59	67	58	67	43	50				
Deaths from Pleurisy, Pneumonia, Empyema, Pericarditis, ...	265	10	8	8	16	12	15	10	17	11	10	10	13	8	12	15	9	18	11	14	2	13	10	13	0			

GENERAL MORTALITY.

	Total Observations.	Proportion per 1000.			
		A.M. 12-6	NOON. 6-12	P.M. 12-6	P.M. 6-12
Virey : quoted from Oesterlen, ...	304	237	273	250	240
Buck : quoted from Oesterlen, ...	1,958	306	242	211	241
Berlinski and Casper, ...	5,591	252	291	243	214
Schneider, ...	114,183	268	261	233	238
Steele, ...	2,452	268	223	285	224
Smoler, ...	1,000	334	276	189	201
Watson, ...	13,854	250	264	246	240
Quetelet, ...	5,250	266	252	278	204
CHRONIC DISEASES.					
Berlinski and Casper, ...	4,463	255	301	239	205
Schneider,* ...	4,266	287	255	239	219
Finlayson, ...	4,045	231	326	262	181

ACUTE DISEASES.

	Total Observations.	Proportion per 1000.			
		A.M. 12-6	NOON. 6-12	P.M. 12-6	P.M. 6-12
Anderson : Fever, ...	500	256	242	280	222
Berlinski and Casper—					
Fevers and Exanthems, ...	462	234	260	236	270
Inflammations, ...	666	240	246	274	240
Schneider : Fevers and Exanthems,†	708	239	234	260	267
“ Inflammations,† ...	1,430	275	211	245	269
Finlayson : Fevers and Exanthems,	1,487	260	252	257	231
“ Acute Diseases, ...	6,183	270	247	261	222

* Made up from his entries against the following : Bauch—und allgem. Wassersucht, Sticfluss, Lungenlähmung, Scropheln, Lungenschwindsucht, Abzehrung, organische Krankheiten des Gehirns, Herzens, &c., Krebs, Entkräftung.

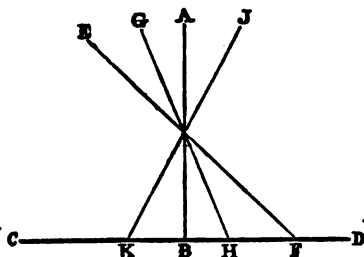
† Made up from his entries against Fieber, Scharlachfieber, Masern, Pocken.

‡ Viz. : Gehirnentzündung, Luftröhrentzündung und Bräune, Entzünd. der Brustorgane, Entzünd. der Unterleibsorgane, hitzige Gehirnhöhlen-Wassersucht.

III.—THE SACRUM—ITS VARIATIONS, AND THE INFLUENCE BY IT EXERTED ON THE SOFT PARTS AS DETERMINING THEIR VARIATIONS.

By JAMES ST CLAIR GRAY, M.D., C.M., F.F.P. & S.G., *Assistant to the Professor of Physiology, Glasgow University.*

ANY one who has had occasion frequently to examine digitally per vaginam, or frequently to introduce the vaginal speculum, must have been struck by the fact, that in relation to the various bony prominences in the vicinity, the external meatus was by no means constant in situation; and that the general direction of the vaginal cavity varied exceedingly, so that a line drawn from the centre of the external meatus to a central point in the upper portion of the cavity formed, with the long axis of the body, or a line drawn parallel thereto, an angle, varying in different cases over several degrees. This may, perhaps, be most clearly and satisfactorily demonstrated by introducing into the vagina an ordinary glass speculum, when it will be found that the direction in which the external portion of the instrument points—supposing the patient in the erect posture—is in one class of cases downwards and forwards, in another class the direction is nearly downwards, while in a third class the direction is downwards and backwards;—in all, a possible variation of nearly 30° . Diagrammatically, this may be illustrated thus: Suppose the line A B represents



the long axis of the body, and C D a line at right angles thereto, the first class of cases would be represented by the line E F, the second by the line G H, and the third by the line J K.

In the *British Medical Journal* for June 22, 1861, my father, in a letter concerning laceration of the perinæum, pointed out the fact that there was great diversity in the position, length, and relation to the pubis and coccyx of the perinæum, and he classified these diversities as follows:— When the perinæum was long, and its anterior margin near the pubis, he termed it *pubical*; when shorter and almost equidistant from the pubis and coccyx, *axial*; and when nearer the coccyx, *coccygeal*.

This classification I would now adopt to the subject in hand, terming that variation of vaginal axis represented by the line E F as *pubical*, G H as *axial*, and K J as *coccygeal*.

It is also curious to note that, in most cases in which the vaginal axis thus varies, the corresponding variation in the perinæum occurs.

My attention was first directed to these variations while attending cases of midwifery in connection with the Lying-in Hospitals, and since then, both in obstetric practice and in the study of the anatomy of the parts concerned, as occasion supplied, I have endeavoured to arrive at the cause of these variations, and the influence they exercise upon parturition; and in the following remarks I have endeavoured, in a form as condensed as possible, to state the result of the observations made, and the deductions which, from premises thus obtained, I consider myself warranted in drawing.

Recognizing, then, as the starting point, the two facts, that neither was the orifice of the vagina constant in its position relative to the pubis and coccyx, nor the direction of its cavity invariable, I first turned my attention to the sacrum, as I there expected to receive some clue to the cause of the variations referred to. Nor was I disappointed. In the excellent collection of Pelves belonging to Professor Allen Thomson, I had abundant proof afforded me, in the first instance, that the sacrum was not constant in form, the variations being specially noticeable as regards the curve presented by that surface which bounds posteriorly the pelvic cavity; thus some sacra presented very considerable

curvature; others were as flat as a board; while between these extremes all gradations presented themselves; and, as a consequence, the antero posterior diameter of the outlet—that is, the distance from the subpubic arch to the tip of the coccyx varied from $3\frac{1}{4}$ to 7 inches. Observing, then, the relation of the soft structure in the various female subjects which presented themselves in the anatomical laboratory, as well as by careful digital examination in obstetric cases, I ascertained that, whenever the sacrum was flat, the axis of the pelvic cavity was coccygeal; when the curve was moderate, the pelvic axis was axial; and when the curve was exaggerated, the pelvic axis was pubical. By this means, I therefore ascertained that the variation in the form and relations of the soft parts, and of the cavity, were always (at least in my experience) co-related, if not dependent upon variations in hard structures, and having ascertained this, I turned my attention to the influence which these variations must exercise upon parturition. Taking into consideration, then, the resistance afforded in each case to the expulsive forces, it occurred to me that, theoretically at least, the coccygeal variety of conformation would oppose less resistance to the passage of the child's head than either of the other two forms, and that, as the pubical variety was approximated, so must the opposition to the expulsive forces be increased, and so in practice do I find it to be the case. Whenever the curvature of the sacrum is great, the case is more tedious than in other cases in which approximation is made to the perfectly flat sacrum. There being, in reality, a definite proportion between the curvature of the sacrum, *ceteris paribus*, and the duration of the labour. But this is not all, as I find there is also a definite ratio between the curvature of the sacrum and the concomitant modification of the soft parts and rupture of the perinæum, or a tendency thereto. Thus, in cases of the coccygeal variety, laying aside, of course, all irregular circumstances, such as excessive friability of the parts, rupture of the perinæum rarely occurs, even if the case be left to nature, and is always preventible by *retraction of the perinæum*. *Support here does harm.*

In the axial variety, moderate attention to the support of the perinæum will universally prevent rupture, while in the case of the pubical variety, support is almost indispensable in order to avoid laceration. As a matter of observation, I may also add, that vaginismus more commonly occurs in the coccygeal than in any other variety of pelvic conformation.

IV.—CLINICAL SURGICAL REPORT FOR THE YEAR 1873, WITH REMARKS ON THE STATISTICS OF AMPUTATION.

By GEORGE BUCHANAN, A.M., M.D., Surgeon and Lecturer on Clinical Surgery, Glasgow Royal Infirmary, &c.

THE portion of the Infirmary set apart for the reception of patients under my charge, consists of three Wards, viz.:—Ward 16, which contains 18 beds for chronic male patients; Ward 24, which contains 15 beds for male accident cases; and Ward 25, which has 18 beds for females. Children under 5 years of age are admitted among the females, and boys over that age are put into the male ward. Thus, there is placed under my sole care a small hospital containing 51 beds, for all kinds of surgical cases. In charge of this department there is my own House Surgeon; also a Clinical Clerk in each ward, whose duty it is to record in a separate journal the more interesting, and all the operative cases; and a staff of dressers, who generally number one to every three beds. In this way a very thorough supervision of every patient is secured.

During the year ending the 31st December, 1873, there were admitted to residence in

Casualty Ward 24	...	Cases 117	...	Cured 102	...	Died 14
Chronic Ward 16	...	" 131	...	" 126	...	" 5
Female Ward 25	...	" 87	...	" 84	...	" 3
Total, ...		395	...	312	...	22

Besides these, a large number of out patients were admitted whose wounds were attended to, and then they went home; coming at intervals for treatment.

The list of casualties admitted into my department during the year, is as follows:—

SIMPLE FRACTURES.			COMPOUND FRACTURES.		
Thigh, ...	...	16	Thigh, ...	...	2
Tibia and fibula, ...	...	18	Leg, both bones, ...	...	9
Tibia, ...	...	2	Tibia, ...	...	1
Fibula, ...	...	3	Fibula, ...	...	2
Humerus, ...	...	8			—
Radius and ulna, ...	...	5			14
Radius, ...	...	2			
Clavicle, ...	...	3	DISLOCATIONS.		
Ribs, ...	...	6	Shoulder, ...	...	1
Spine, ...	...	2	Ankle (comp.), ...	...	3
Pelvis, ...	...	3			—
Metacarpus, ...	...	1			4
		—			
		69	Rupture Lig. Patellæ, ...	...	1
SMASHES.			OUT PATIENTS.		
Thigh, ...	...	1	Simple Fracture, ...	...	33
Leg, ...	...	5	Dislocation, Shoulder, ...	...	6
Arm, ...	...	3	Dislocation, Elbow, ...	...	2
Foot, ...	...	2	Incised and lacerated wounds	...	70
Hand, ...	...	4			
Great Toe, ...	...	2	Cut Throat, ...	...	1
		—			
		17	Scalp Wounds, ...	...	many.

In explanation of the foregoing table, it is necessary to state that in our hospital nomenclature we distinguish between compound fractures, in which the amount of injury, however severe, is still not so great as to preclude the consideration of the propriety of endeavouring to save the limb; and smashes where there is hopeless shattering of the bone and pulpifying of the soft parts. Unfortunately such injuries are far from uncommon, as the result of machinery and railway accidents.

Besides those admitted to the regular wards, I had charge of a number of cases of severe burn. These are admitted into two wards set apart for the purpose, one for males, the other for females. There are also three separate apartments, in a part of the hospital removed from the other patients, for the reception of cases admitted with erysipelas, sloughing wounds, or pyæmia, of which there are always a considerable number, over and above those which assume these characters

while resident in the Infirmary. Of this class of cases I had, during the year, patients admitted with erysipelas, 11, with 1 death; burns, 58, with 2 deaths. Adding these to the former table gives—

Total cases,	Dismissed cured or relieved,	Died,
404.	379.	25.

This shows a mortality of one in sixteen, or about 6 per cent. of the whole cases admitted. I do not think that any general argument can be drawn from the consideration of such a comparatively small number of cases. Still, so much has been written on hospitalism lately, that it must be encouraging for those who have to deal with patients in our Infirmary, to note such results. Looking over the table of accidents and the list of operations, it must be admitted, that one could scarcely hope for a more favourable general result if similar cases had to be treated in private practice.

If the table of operations be examined, it will be seen that 110 operations of greater or less magnitude have been performed during the year with 10 deaths, a fatal result thus happening in every 11 operations, or, in other words, a mortality of 9 per cent.

The operations, however, are so different from one another in magnitude and risk, that there is no value to be attached to such a general statement, so that it may be of more interest to draw attention to the major amputations, which are usually taken as the ground of comparison between hospital and private practice, and one hospital and another.

The first thing which is of interest in the practice of our Infirmary, is the large number of amputations which fall to the lot of each surgeon. In the year 1873, I had 27 amputations, excluding all partial operations of hand or foot, of which 13 were primary for injury; and of the whole 27 only 4 died, or 1 in $6\frac{1}{2}$, or 14.8 per cent.

Since the year 1865, I have kept a record of all the oper-

ations I have performed in the Infirmary, and the following tables contain an account of the amputations. The year 1869 is omitted as I was not acting then, that being an interval between the conclusion of my first term of office and my second appointment.

In the tables the thigh includes Carden's operation or amputation just above the knee, and the fore-arm includes amputation at the wrist-joint. This has been done to save complication of the tables.

Before giving these, I append a list of the amputations during one year in the great hospitals of London, to the reports of which I could get access.

GUY'S HOSPITAL, 1872.			
	Successful.	Died.	Total.
Thigh, ...	16	7	23
Leg, ...	4	6	10
Shoulder, ...	1	0	1
Arm, ...	4	1	5
Forearm, ...	3	0	3
	<u>28</u>	<u>14</u>	<u>42</u>

ST THOMAS' HOSPITAL, 1872.			
	Successful.	Died.	Total.
Hip, ...	0	1	1
Thigh, ...	5	4	9
Leg, ...	2	1	3
Foot, ...	2	2	4
Arm, ...	1	1	2
Forearm, ...	2	0	2
	<u>12</u>	<u>9</u>	<u>21</u>

ST BARTHOLOMEW'S HOSPITAL, 1872.			
	Successful.	Died.	Total.
Thigh, ...	16	5	21
Leg, ...	7	1	8
Foot, ...	3	0	3
Shoulder, ...	0	1	1
Arm, ...	1	0	1
Forearm, ...	6	0	6
	<u>33</u>	<u>7</u>	<u>40</u>

ST GEORGE'S HOSPITAL, 1871.			
	Successful.	Died.	Total.
Thigh, ...	10	2	12
Leg, ...	3	2	5
Foot, ...	5	1	6
Arm, ...	3	1	4
Forearm, ...	5	0	5
	<u>26</u>	<u>6</u>	<u>32</u>

GLASGOW ROYAL INFIRMARY, 1873.—TOTAL AMPUTATIONS.

	Successful.	Died.	Total.
Thigh, ...	24	13	37
Leg, ...	12	4	16
Ankle, ...	24	2	26
Shoulder, ...	4	3	7
Arm, ...	9	1	10
Forearm, ...	8	2	10
	<u>81</u>	<u>25</u>	<u>106</u>

UNIVERSITY COLLEGE, FROM PROF. ERICHSEN'S PAPER.

Table of 80 consecutive Cases of Amputation (excluding all partial amputations of hand and foot) performed in University College Hospital from July 1, 1870, to December 1, 1873.

Amputations.	Total.	Cured.	Died.	Cause of Death.
<i>Primary—</i>				
Hip Joint,	1	0	1	Shock.
Thigh (above middle),	2	0	2	Shock in both.
Thigh (below middle),	3	2	1	Pyæmia.
Knee,	1	0	1	Erysipelas.
Leg (upper half), ...	2	1	1	Exhaustion third day.
Leg (lower half), ...	5	4	1	Pyæmia.
Foot,	2	2	0	
Arm,	3	2	1	Died of internal injuries in a few hours.
Forearm,	3	3	0	
Multiple amputations,	3	2	1	Exhaustion.
Total primary, ...	25	16	9	36 per cent.
<i>Secondary—</i>				
Thigh (below middle),	4	3	1	Exhaustion fifth day.
Knee,	1	1	0	
Leg,	2	2	0	
Shoulder-Joint, ...	1	0	1	Pyæmia.
Forearm,	3	1	2	Pyæmia; tetanus.
Total secondary,	11	7	4	36·3 per cent.
<i>For Disease—</i>				
Hip-Joint,	2	2	0	
Thigh,	14	12	2	1 died of Bright's disease, 1 pyæmia and amyloid liver.
Knee and Condyles,	6	4	2	Pyæmia in both.
Leg,	7	6	1	Pyæmia.
Foot and Ankle, ...	4	4	0	
Shoulder-Joint, ...	1	1	0	
Arm,	5	4	1	Pyæmia.
Forearm,	5	3	2	Exhaustion in both cases; old people, with destruction of wrist and cellulitis.
Total for disease,	44	36	8	18·1 per cent.
Total of all cases,	80	59	21	26·2 per cent.

TABLE OF AMPUTATIONS BY DR GEORGE BUCHANAN.

1865.	Successful.	Died.	Total.	1870.	Successful.	Died.	Total.
Thigh, ...	3	2	5	Thigh, ...	9	0	9
Leg, ...	4	2	6	Leg, ...	2	0	2
Ankle, ...	4	0	4	Ankle, ...	2	1	3
Shoulder, ...	1	2	3	Arm, ...	1	1	2
Arm, ...	3	0	3	Forearm, ...	4	0	4
Forearm, ...	3	0	3		18	2	20
	18	6	24				
1866.	Successful.	Died.	Total.	1871.	Successful.	Died.	Total.
Thigh, ...	1	5	6	Thigh, ...	8	1	9
Leg, ...	2	3	5	Leg, ...	0	1	1
Ankle, ...	2	0	2	Ankle, ...	8	0	8
Shoulder, ...	2	0	2	Shoulder, ...	1	0	1
Forearm, ...	2	3	5	Arm, ...	7	0	7
	9	11	20	Forearm, ...	4	0	4
					28	2	30
There was an outbreak of pyæmia in the year 1866.							
1867.	Successful.	Died.	Total.	1872.	Successful.	Died.	Total.
Thigh, ...	6	1	7	Thigh, ...	6	2	8
Leg, ...	2	0	2	Hip-Joint, ...	0	1	1
Ankle, ...	2	1	3	Leg, ...	2	1	3
Shoulder, ...	1	0	1	Ankle, ...	3	0	3
Arm, ...	1	0	1	Arm, ...	5	0	5
Forearm, ...	3	0	3	Forearm, ...	7	0	7
	15	2	17		23	4	27
1868.	Successful.	Died.	Total.	1873.	Successful.	Died.	Total.
Thigh, ...	5	3	8	Thigh, ...	12	3	15
Ankle, ...	6	1	7	Leg, ...	1	0	1
Shoulder, ...	0	1	1	Ankle, ...	6	0	6
Arm, ...	0	1	1	Shoulder, ...	0	1	1
Forearm, ...	1	0	1	Arm, ...	2	0	2
	12	6	18	Forearm, ...	2	0	2
					23	4	27

RESUME OF AMPUTATIONS, BY DR G. BUCHANAN, IN 1865, 6, 7, 8, 70, 71, 72, 73.

	Successful.	Died.	Total.
Hip, ...	0	1	1
Thigh, ...	50	17	67
Leg, ...	13	7	20
Ankle, ...	33	3	36
Shoulder, ...	5	4	9
Arm, ...	19	2	21
Forearm, ...	26	3	29
	146	37	183

or 1 death in 5 amputations, or about 20 per cent.

From the foregoing tables a number of lessons may be learned, which go far to corroborate in a small but decided way some of the conclusions by Mr Erichsen in his recent observations on amputation. They show the fallacy of trusting to numerical statistics only. Also, the variety of results from year to year in the practice of the same surgeon in the same hospital. Suppose the fatal year 1866, when there was such a prevalence of pyæmia and phlegmonous erysipelas, in private as well as hospital practice, excluded from the tables, and the mortality falls from 18 to 15 per cent. In 1866 the total number of amputations in the Infirmary was 81, and of these 35 died.

Again, take the case of amputation of the thigh. In 1870, I had 9 without any deaths; in 1871, 9 with 1 death, or 1 in 18 consecutive cases—add 1872, 8 cases with 2 deaths, and it rises to 1 death in 9, and 1873, 15 cases with 3 deaths, and the average comes to 1 in 7. One or two additional deaths would completely destroy this favourable average; or exclude those in which death was a necessary result from other injuries complicating that of the limb—the operation being done as a temporary palliative—and the per centage of mortality would be greatly lower.

Returning to the table of operations for the present year, it is satisfactory to note that of all the fatal cases only two died from causes which could possibly be attached to hospital influences. It is questionable if recovery could have taken place in any event in the case which died of pyæmia. In the other three cases of death after amputation, the operation was performed in almost hopeless circumstances. In one, both legs were smashed to pulp, and the operation was done simply to remove the shattered limbs, which in the warm weather would soon have become putrid. Traumatic gangrene with delirium set in in 48 hours.

In another case the limb was removed in almost similar circumstances, and the patient died within 24 hours. In the fatal case of amputation at the shoulder, the scalp was torn into ribbons, but as the boy was quite sensible, amputation was performed, and it was only after five days that signs of

inflammation of the membranes of the brain came on, and terminated fatally in 48 hours. At the *post-mortem* examination extensive fracture of the base of the skull was found, a necessarily fatal complication.

A question sometimes arises, why are there so many amputations in Glasgow Royal Infirmary? Are limbs not sometimes amputated which might be saved? With regard to amputation for injury, certainly not; if anything, the tendency is the other way. Since the introduction of antiseptic treatment as a system, there is no question that many limbs have been saved, which formerly would have been amputated. But on the other hand it is equally true, that some lives have been lost in the attempt which has been made to treat antiseptically, limbs which have been hopelessly crushed, and in which the attempt not only has failed, but deprived the patient of the chance he would have had by primary amputation. Referring to amputation for disease, I can safely say that in every case I performed, the examination of the parts subsequent to removal has satisfied me that the only alternative—excision of the affected joint—would not have been attended with success.

It is to be remembered also that in amputations for injury, at all events the vast majority of them, the question is not between amputation and an attempt to save the limb, but between certain death and an attempt to save life by amputation. In many cases the surgeon removes a limb, almost convinced that the injuries which other parts of the body have sustained must necessarily prove fatal in a few days; still, if the patient rallies from the immediate shock of the accident, he cannot be left with the crushed and mangled member during the interval.

The last case of smash of the limb complicated with internal injury, which came under my charge, seemed, on admission, so certain to be fatal in less than 48 hours, that I contented myself with placing the limb in an apparatus with soothing dressing, yet the patient lived long enough for the parts to become putrid and offensive in the extreme. Amputation, though necessarily to be followed by a fatal

result, would have made the poor fellow more comfortable the few days he had to live.

Such cases ought to be excluded from the statistics of amputation.

LITHOTOMY.—There were four cases of this operation.

The first case was a boy, aged 8 years, on whom a medical man in another town had endeavoured to operate, about two months previous to his admission to the Infirmary. The operator informed me that after the deep incision had been made, the forceps had failed to reach the bladder, though they seemed to enter as far as to do so. A second attempt proving futile, he desisted from his efforts, leaving the stone in the bladder. A fistulous opening remained in the perineum, through which urine dribbled from the urethra. This, along with the contraction caused by the partial cicatrization of the wound, made it necessary that the operation should be performed with more than usual caution. I did it with the rectangular staff, and removed the stone without difficulty. The recovery was rapid.

The second case was performed by Dr H. Cameron, during my absence. The patient was a boy aged 6, and the operation was accomplished without difficulty, but, unfortunately, peritonitis set in, and he died on the fifth day.

The next case presented nothing worthy of record. It was done by the rectangular method, and made a good recovery.

The fourth was a man aged 70, with oedema of the lower extremities, and some cough. The irritation of the bladder was great, from the presence of a large mulberry calculus. The incision was made with the rectangular staff, and there was some trouble in catching the stone with the forceps, in a suitable way, owing to its strange shape. It weighed one ounce and one-tenth, and consisted of two globes, connected by a thick neck—something like an hour-glass. The patient made a very rapid recovery. He left the Infirmary 14 days after the operation, the urine all coming by the natural passage.

The other operations are sufficiently detailed in the table.

One Amputation at Shoulder Joint,—Death.
 Dec. 11...D. S.,.....aged 14.....Smash of arm....Amp. at shoulder joint...Died.....Large scalp-wound...Fracture of base...Cerebral meningitis.

Two Amputations of Arm.

March ...R. W., ...aged 20.....Smash of armAmp. above elbow.....Successful...
 Nov. 1...A. M'A., " 29....." " "

Two Amputations of Fore-arm

March 7...A. M'D.,...aged 55.....Smash of hand.....Amp. at wrist.....Successful...
 July 5...P. M'M.,... " " " "

Sixteen Amputations of Fingers.

All Successful.

Four Excisions of Elbow.

April 9...H. G.,.....aged 7.....Struma.....Excision of joint.....Successful...
 May 28...E. W., " 15....." " "
 Sept. 8...J. L.,... " 14.....Synovitis..... " "
 " 17...T. M'T., " 19.....Struma..... " "

One Excision of Head of Humerus.

May 1 Disease of Head of Bone.....Excision.....Successful...

One Excision of Wrist.

March 28...W. C., ...aged 19.....StrumaExcision of joint.....Successful...

Excision of Lower Jaw.

Nov. 26...J. C.,.....aged 53.....Epithelial tumour.....Excision of half of jaw.....Successful...

Ten Excisions of Bone,—One Death.

March 7...J. M'K., aged Comp. fract. of leg..... Piece of tibia removed.....Successful...
 April 10...R. H., " 49.....Disease of ulna Head of bone removed..... "

Ten Excisions of Bone, —One Death—Continued.

May 6	Comp. fract. leg.	Removal of protruding bone	Successful
" 10	T. C., aged 15	Protruding bone from stump	"
" 31	M. F., "	Removal of bone	"
June 10	A. H., "	Necrosis of tibia	"
" 24	J. W., "	Caries of metatarsus	"
" 26	D. M'N., "	Fract. skull	"
" 26	A. B., "	Necrosis of metatarsus	Internal suppuration
Oct. 13	W. N., "	Necrosis of fibula	Successful
		Removal of bone	"
		Removal of sequestrum	"

Eleven Excisions of Tumours.

Jan. 18	W. P., aged 41	Tumour of lower jaw	Excised	Successful
" 31	E. R., "	Epithelioma of lip	"	"
March 6	H. E., "	Malignant tumour of testicle	"	"
May 28	J. M., "	Epithelioma of scrotum	"	"
June 7	J. W., "	Malignant disease of testicle	"	"
" 25	A. M., "	Epithelioma of lip	"	"
July 30	T. M., "	"	"	"
Aug. 18	A. M'D., "	"	"	"
" 21	F. D., "	Tumour of axilla	"	"
Sept. 30	T. M., "	" knee	"	"
Dec. 10	A. M'D., "	Epithelioma of lip	"	And lip restored

Lithotomy—Four Cases.

Feb. 8	D. M'P., aged 8	Uric Acid, Calculus	Rectangular	Cure
April 30	S. M'G., "	"	Rectangular	"
June 4	J. C., "	"	Rectangular	Died
Dec. 13	J. C., "	Mulberry, $\frac{1}{2}$ oz.	Rectangular	Cure
		Mulberry, $1\frac{1}{2}$ oz.	Rectangular	Cure

Five Cheilo-Plastic Operations.

June 24	T. G., aged 1	Hare lip	Congenital	Successful
" 24	P. F., aged 5 mths.	"	"	"
May 30	H. F., aged 6 "	"	"	"
Aug. 5	A. M'B., aged 4 "	"	"	"
Oct. 24	E. S., aged 4 "	"	"	"

V.—ON PARAKENTESIS OF THE MEMBRANA TYMPANI: OBSERVATIONS HISTORICAL AND CLINICAL.

By JAMES PATTERSON CASSELLS, M.D., M.R.C.S. *London; Fellow of the Faculty of Physicians and Surgeons. Surgeon to the Glasgow Dispensary for Diseases of the Ear.*

(*Read before the Medico-Chirurgical Society, 6th March 1874.*)

AMONG the many things or circumstances, which have in recent years occasioned the awakened interest in Aural Medicine and Surgery, were I asked to name such of them as have done so in a greater degree than others, I should at once point to two valuable therapeutic agents, as entitled to this honour; viz.: To the Compressed Air Douche, and to the operation of Parakentesis of the Membrana Tympani. By the aid of these operations, the specialist has been enabled to treat successfully a class of cases of frequent occurrence, and, before their introduction, commonly regarded as incurable. Many of the affections of the Eustachian Tube in childhood, and not a few of the diseases of the middle ear at all ages, now readily cured by these operations, would, but for their assistance, have remained unalleviated, and been regarded, by those, who cared not to comprehend the difficulties of the surgeon, as the opprobria of Aural Surgery. Happily, this accusation is no longer possible, and to affirm that these operations have contributed much to, if they have not altogether occasioned the progress which characterises the history of this speciality during the last decennium, seems therefore warrantable.

It is true, nevertheless, that these operations, and the speciality itself even, ran no inconsiderable risk of being regarded with disfavour, owing to the misdirected zeal and indiscrimination which possessed those who at first had adopted them. But these evils were powerless to arrest the advance I have alluded to, and those who propagated them, have been, or are being taught by experience, that the air douche is not a universal remedy for deafness, and that to puncture the membrana tympani is an operation not free from the risk of the most violent complications.

The scientific surgeon of to-day, profiting by the lessons which the errors of his predecessors teach, will define with greater precision the conditions in which these operations are admissible. Reflecting credit upon himself, he will hasten the day, when aural surgery and medicine must have its recognised place in the curricula of our schools.

The history of the operation to which I now direct your attention, is indeed one of much interest, because of the vicissitudes through which it passed at two periods in the history of aural surgery. Periods widely different from each other, it is true, in many essential respects, yet, reacting upon the operation itself in precisely the same way; influences which, for a time at least, were powerful enough to retard the acceptance of parakentesis of the membrana tympani as a recognised operative procedure in aural surgery.

Prior to 1649 no one had suggested (so far as I can learn) the possibility of curing diseases of this organ causing deafness, otherwise than by the instillation of oils or the innunction of animal fats. A practice which antiquity renders venerable, finding, as it does, a recognised place in Egyptian aural therapeutics as early as the time of Ramesis the IX.*

From 1649 began what we may style the surgical era in aural therapeutics, a period lasting till the early years of this century, during which much valuable work was accomplished tending to the advance of this speciality. In this year, Riolan,† a distinguished anatomist, had his attention directed to the subject of the membrana tympani in its relation to the function of the organ in the following manner:—A person, who had been very deaf for many years, related to him, that one day using a pointed instrument to pick his ear, he accidentally destroyed the membrana tympani, and broke down the ossicular chain. Not only did he not suffer in consequence, but amazing to relate, was cured of his infirmity.‡ The mistiness which surrounds the history of

* On the authority of Professor Brugsch, of Cairo.

† Jean Riolan, born in Paris, 1577, died there in 1657.

‡ *Encheiridion anatomicum et pathologicum* Lugd. Bat. 1649, p. 290, quoted by Schwartz in his brochure in the *Arch. für Ohrenheil*, B. ii., 1865. Sabatier, vol. ii., p. 127, relates the story: In the lengthened notice of Riolan in Portal's

this case prevents us affirming or denying anything whatever concerning its nature; nor is this, we think, necessary; sufficient for our purpose, that it is an historical fact, and that it undoubtedly suggested to the mind of Riolan the idea of destroying the membrana tympani in order to cure those who were incurably deaf. I need not say that the proposal, when formally made by Riolan, created much remark and no little adverse criticism by the anatomists and surgeons of the time. Many circumstances tended to hinder the suggestion made by Riolan from being carried out, chief among them being, the exaggerated value attached by anatomists to the physiological office which this structure occupied in the function of hearing.*

Men of science had had their attention directed to the subject, however, and we find the most distinguished and enthusiastic of their number instituting experiments on the lower animals to determine what effect was produced upon the function of the organ, by partial and complete removal of the membrane. Thus, in 1660, Willis showed by experiments on dogs, that the hearing was not lost by its rupture.† After him the question seems to have lain in abeyance and evidently unsettled, for, in 1740, Valsalva and, about the same time in England, Cheselden, were experimenting on dogs with the same object and a like conclusion. To these experiments Cheselden added the clinical observation of cases of perforation of this membrane from disease in man, and thus was able more satisfactorily than any previous experimenter had done, to settle the question.‡ Satisfied that the hearing was not destroyed in such circum-

Histoire d'Anatomie, there is no mention of the subject, and the account, especially of the *Encheiridion*, is very exhaustive. I endeavoured to consult the original work, but failed to procure a copy of it; it matters little, for I have implicit faith in the accuracy of Schwartze's reference which I here give.

* The function and structure of this membrane were frequently the cause of grave disputations among them. See the disputation held between Busson and Dienert, and answered by the former in the affirmative. "An absque membrana tympani apertura topica injici concham possuit." Haller *disp. chir. selectæ*, vol. ii.

† I could not procure a copy of Willis to consult, but his experiments are criticised by Valsalva in his celebrated "*Tractatus de aure humana*," chap. v., p. 5. 1740.

‡ *Anatomy of the Human Body*, p. 306. 1750.

stances, he desired to operate upon a healthy human being to enable him to conclude that the operation was free from danger to the life of the individual. Obtaining the consent of the authorities of the day to operate upon a man who lay in prison condemned to death, the latter stipulating for his freedom if he survived the operation, Cheselden was about to do what had not been accomplished by any surgeon previous to his time. Alas, the prisoner fell sick, the public became aware of the whole affair, and put a stop to the operation by the violence of its clamour. Cheselden seemed from that time to have no further interest in the question.* To him, however, belongs the honour of suggesting that the membrana tympani should be perforated in order to improve the hearing, in cases of disease, in which the sonorous waves were prevented passing to the sentient apparatus of the organ.

In France, about the same time, Dienert† recommended the operation for removal of blood or mucus from the tympanum, but never performed it. Itard, however, in his work, *Traité des Maladies de l'Oreille et de l'Audition*, declares that 16 years before either Cheselden or Dienert, Julien Busson had made a similar proposal.‡ In 1760, a person named Eli,§ a charlatan, laid claim to have performed cures by this operation, but if he did, his success was not known to two contemporary surgeons, viz., Portal and Sabatier, for the former asks, in 1768, if, in thickening of the membrana tympani, it would be allowable to make a small perforation in that structure,|| and Sabatier asks, in 1775, if, in cases of relaxation of the membrana tympani, its perforation was free from danger, and what success would likely attend the operation. ¶

* The story is referred to in Walpole's *Reminiscences*. The criminal was said to be Cheselden's own cousin. See also Wilde's text book.

† The same who defends in the disputation with Busson already referred to.

‡ I have not been able to substantiate this statement made by Itard. My examination of Busson's writings was somewhat hurried and incomplete.

§ Saissey—*Essai sur les Maladies de l'Oreille interne*, 1827—speaks highly of this Eli, and gives, in a foot-note, a Latin quotation from his writings to show that he undoubtedly performed the operation.

|| *Précis de Chirurg. pratique*. t. ii. pp. 480. Paris: 1768.

¶ *Traité Complet d'Anatomie*. Vol. ii. 1775.

At this period in the history of the operation, as is always the case where rival claims are advanced to any honour, we find some difficulty in assigning to the proper individual the merit of being first to perform the operation for the purpose of curing deafness. Sir William Wilde has adjudged that honour to Dr Peter Degrauers, who styles himself professor of anatomy and physiology. In his work on the Ear, published in Edinburgh, in 1778, he undoubtedly makes mention of two cases in which he performed this operation, and seems astonished at the rapidity with which union of the incision in the membrane took place.* Ten years before him, Kratzowitz recommended the operation, but I cannot say whether or not he performed it, as Degrauers seems to have done. In 1797, Karl Himly demonstrated to his pupils that the operation was free from danger and not difficult to perform. It was not till the beginning of this century (1806) that he had an opportunity of performing it upon a patient, at which time he recommended its performance in cases of deafness arising from complete closure of the Eustachian tube.† Sir A. Cooper had previously, in 1800, published his observations upon the effect produced by the loss of the membrane, in relation to the function of the organ; and in 1801 he added to these, the results obtained by performing the operation of parakentesis in cases of deafness. These meritorious labours were rewarded by a medal from the Royal Society,‡ and as he had four successful cases in succession, the consequence was not difficult to foresee; all deaf and hard-hearing people, from the rising to the setting sun, crowded his reception rooms, to have their drums punctured. Success did not, however, continue to attend his operations. After operating upon fifty patients, without satisfactory results, he abandoned the proceeding about 1803, fearing least his deservedly great reputation as a surgeon might suffer by these unsuccessful operations.

* Sir William Wyld's "Aural Surgery."

† Ueber die Durchbohrung des Trommelfells. 1810.

‡ *Philosophical Transactions*. 1800.

The reports of the success which was said at first to attend Sir Astley's earlier operations, stimulated Continental surgeons to emulate his labours. Concerning their work and the results they obtained, I shall presently speak.

It is not difficult, at the present time, reviewing the labours of this distinguished surgeon in the light of the imperfect knowledge of all that pertained to Otology in the beginning of this century, to see why he did not succeed, and to find a valid excuse for his failures. In the first place, I feel satisfied that he selected a pathological condition, viz., closure of the Eust. Tubes, for which the operation was not fitted, at least, as he performed it, to give a permanent result ; and secondly, his method of diagnosis, as to the presence of that pathological state, was extremely uncertain. A method which, even in the present day, is relied upon by some practitioners.

Sir Astley diagnosed these tubes to be permanently closed when the patient failed to inflate the tympana by the Valsalvian method. How unreliable this method is, for the purpose to which it was put by him, may be judged of from one's own experience, and the fact, that not many people can so inflate their tympana without previous teaching, and some, even with that, can never accomplish it. Again, aural pathology in 1800, except in name, did not exist; while Lænnec's valuable discovery in relation to this organ, and which is so helpful to the surgeon to-day in the diagnosis of affections of the tympana and tubes, was not known till a later period (in 1819). If, with these, we consider the imperfectly understood anatomy of the organ, and the defective modes of illumination of the membrana tympani then in use, we need not wonder to-day at Sir Astley's failures, nor find difficulty in assigning them to their true cause.

I am disposed to think, that it is hardly possible to exaggerate the baneful influence, which his unsuccessful operations had upon the progress of aural surgery at that period. The deservedly great reputation of that eminent surgeon, lent all its weight to these failures. The operation was

abandoned in consequence, and in this way, I believe, the progress of this speciality was retarded for a time.

Turning our attention to the Continent of Europe, where, as I have already said, much interest was awakened by the reports of Cooper's early success, we find in France, Ribes, Maunoir, and Celliez, operating, but with indifferent success. In Germany, a professor in Marburg University operated upon a patient, got what he considered good results, communicated the information to Hunold in Cassel, who began to operate at once on every deaf or partially deaf person. In a few weeks he performed one hundred operations. He reports seventy cases either cured or permanently improved out of that number.* Michaelis, the Marburg professor already alluded to, continued to operate and did 63—whereof 42 were without success, 21 doubtful, and only one after some years could be said to have been cured by the operation. Even about this single case critics are disposed to quarrel, and to regard it in the same light as Cooper's 4 successful cases, as curable by other means. Notwithstanding this continued want of success, the operation became fashionable on the Continent of Europe, and in 1810, every one who was deaf or did not hear acutely enough to please his taste, had his *membrana tympani* perforated; the poor even imitated their betters, and consequently deaf mutes went in for the cure. It is easy to credit some of the statements made at this time, that many surgeons, while the fashion was at its height, operated upon hundreds of patients in the course of a few weeks.† At this juncture, Ilmly raised his voice against the folly and fashion of the day, and boldly stated, that not only was it not a universal remedy, but one not free from danger, and, as a consequence, soon the rage diminished and altogether ceased.‡

From this time, with the exception of communications on the subject by Rust in 1813, and Kern in 1828, we hear nothing more about the operation in Germany, till its

* Saissy, *op. cit.* p. 80

† Hunold *op. cit.*

‡ "Commen. de perfor. Mem. Tym." Gott., 1808.

revival in 1865, by Professor Schwartz of Halle.* The investigations of Karl Himly and others, clearly show that the results of the early German operations were not lasting. Turning to France at this time, we find the same rage, and alas the same or pretty similar results. Itard, the founder of French Aural Surgery, with characteristic genius bringing pathological investigation to his help, found in a case of deafmuteness, that the tympana were filled with mucus. He conceived the plan of incising the membrana tympani, and washing out this semi fluid mucus from the middle ear. The first case he operated upon resulted favourably, but all the others were without success.† Saissy (in 1822), in Lyons, a surgeon of great reputation, operated several times with success,‡ and Deleau père, the inventor of the compressed air douche, about the same time, operated, but with what result is not clearly to be ascertained.§ From this time till 1843, in France, the operation was condemned and abandoned.||

About this time, in Germany, we find Kramer and Rau operating with more than doubtful success, and Mènière and Bonnafont, in France, with results not particularly encouraging. Mènière, one of the most scientific and diligent, as well as energetic, aural surgeons of the present century relates one or two cases cured by this operation, and Bonnafont, the present veteran savan of this speciality in France, relates, in his text-book,¶ several cases in which he had performed the operation. The difficulty he experienced being to maintain the incision or perforation patent, a

* "Ueber die kunstliche Perforation des Trommelfells, Studien u Beobachtungen," Arch. Fur. Ohrenheil, 1865, and "Weitere Erfahrungen u Beobachtungen ueber die Paracentese des Trommelfells, same Arch. 1872. To the former paper I am indebted for dates, and on one or two instances for references where the original works were not procurable. Both papers reflect the greatest credit on their talented and distinguished author.

† Itard, op. cit.

‡ Essai sur les Maladies de l'Oreille interne.

§ Recherches pratique sur les Maladies de l'Oreille, 1838.

|| Memoire (par. Hubert Valleroux), sur l'abus et sur les dangers de la perforation de la membrane du tympan, &c., 1843.

¶ A critical notice of the 2nd Edition of which appears among "Recent works on Diseases of the Ear," in the present number of this *Journal*.

difficulty which all operators had experienced before him, and in a great measure since.

Retracing our steps in the chronological order of the history of this operation, and turning our attention to England, we find much to interest us. You will remember that Sir A. Cooper, in 1803, had abandoned the operation, and that we had ventured to express the opinion, that the results in his hands had retarded the progress of this speciality.

Notwithstanding the unfortunate effects of Sir A. Cooper's failures, the originality of his experiments and operations, already mentioned, entitle us to claim for an Englishman, the honour of being first to study and prosecute this special branch of the healing art in a scientific manner. Consequently, when I claim for England the honour of being the home of scientific aural surgery, I need only mention, in addition to the illustrious name of Sir A. Cooper, the names and labours of such men as Saunders, in 1802, and the late celebrated Toynbee, and to-day, Hinton and Wilde, to have this honour granted without dissent.

Saunders, I emphatically style the father of English Aural Surgery. Coming immediately after the brilliant but unsuccessful operations of Sir A. Cooper, he had prejudices to contend against, which might well have daunted a less able man. In 1806, however, he opened the first aural *clinique* in London, and conducted it so ably as almost to silence the prejudices which existed against everything belonging to Otology. In this clinique he conducted the treatment of Aural diseases in a manner which, without doubt, laid the foundation of English Scientific Aural Therapeutics. His work, published about this time, will ever remain as evidence of his genius, and can be read at the present day, even by the specialist, with advantage. In this admirable work, we have the first mention made, by a specialist, of the operation to give exit to collections of pus confined in the tympana. But especially does he dwell upon the importance of so operating in cases of scarlatina, during the course of which the ear became affected, for the purpose, as he says, not only to relieve present urgent symptoms, but to

limit the ravages of the morbid and destructive processes. Elsewhere,* I have treated of the necessity of following his suggestion in this the acute stage of Exanthematous Katarrh, and do not intend to dwell upon it here. I am disposed to believe that no operation of equal magnitude in the whole domain of surgery, whether special or general, if performed at the proper time, is able to lessen the sum of human misery and suffering so much as the one we are speaking about. It is impossible to estimate the number of persons who, for lack of this operation being performed as suggested by Saunders, have either lost their lives or grown up burdens upon the state, from one cause or other, the direct result of this scarlatinous disease of the tympana.†

Saunders seems to have closed his clinique about 1808, and to have found ample scope for his talents in the practice of ophthalmic medicine.

After him, Curtis, his pupil,‡ who thinks highly of the operation, but performs it only once (see work p. 50). we have a period of decadence in English aural surgery, lasting till Toynbee set himself apart to the practice and study of this department of the healing art.

In the works issued by the regular practitioner, during this the dark age of aural surgery in England, we find no evidence that the operation was performed at all. We discover, instead, a tendency to return to the ancient practice of instilling oils. Indeed, certain kinds of wool had special virtues in certain forms of deafness; priceless was that kind from between the ears of a black ram, without a single white hair.§ After this, who dare smile at the over-lauded virtues ascribed to glycerine by celebrated members of the profes-

* See this *Journal*, August, 1872.

† Velpeau, in 1839, said—"La perforation du tympan est encore à prendre rang parmi les opérations utiles et réglées de l'art de guérir;" and Politzer, in 1870, of this operation says—"Einen der praktisch wichtigsten u erfolgreichsten therapeutischen Eingriffe bei den Krankheiten des gehörorgans."

‡ On the authority of Schwartz. I have read Curtis' book and do not find any mention of his being a pupil of the celebrated Saunders. Curtis, who was an ignorant pretender, would not have unintentionally omitted to mention his relation to Saunders, if he had been his pupil!

§ Wilde's Text-book, pp. 42 and 43.

sion, and cures brought about by it, even to restoring the faculties of the deaf mute!*

It was during this period that an enraged, because deceived, public, with much justification, regarded the title of aurist as synonymous with that of quack.

With the appearance of Toynbee, dawned a new day for scientific aural surgery. For a period of 25 years, viz., from 1841 to 1866, he laboured to form a pathological collection, and succeeded not only in this attempt, but in placing the pathological anatomy of this organ on a permanent basis, founding at the same time a school, the influences from which have radiated over the world. The valuable work "On the Diseases of the Ear," which fitly closed the life of this man of genius and culture, only deepens the regret we feel at his premature removal from our midst. In it we have evidences that he had turned his attention to this operation, and although he speaks against the indiscriminate use of it, which characterised the practice of some of his predecessors, he nevertheless points out with remarkable clearness a wider range of pathological states, in which it is likely to be serviceable. He also operated several times, and once upon a man 53 years of age, who had, in boyhood, been operated upon by Sir A. Cooper.

The memory of Toynbee has indeed been perpetuated by his pupils in a remarkable manner, for between the publication of his great work and premature death, several of them were putting his teaching into practice, viz., Schwartze reviving the operation of parakentesis in Prussia, followed by Politzer in Vienna, and Von-tröltzch in Germany, while in England, Hinton, after Toynbee's death, in the very room in which he laboured with his deceased master, was operating for a class of cases and in a manner not dreamed of by any previous aural surgeon.

Hinton's labours were worthy of Toynbee's pupil. Suspecting, what his pathological investigations afterwards

* Clinical reports on the use of glycerine in certain forms of deafness by J. Wakely, F.R.C.S., edited by W. Tindal Robertson. 1857.

proved to be correct, that many cases of deafness arose from accumulations of half inspissated mucus clinging to the ossicular chain, he conceived the idea of the high operation for the removal of these accumulations. As his pupil and a fellow-worker with him in many of these operations, I can bear testimony to the originality and boldness of his conception in attempting to deal with such cases, and to the marked success that followed his treatment. Hinton's undoubted originality and genius, scarcely less than Toynbee's, great though his were, marked him out as perhaps the best qualified of all to carry on the master's work, and to emulate his great achievements. It must deepen the regret of those who wish this speciality well, to know that while I speak he lays down the surgeon's knife, and in a well earned retirement quits the field.

I have ended the hurried remarks and necessarily incomplete observations relating to the history of the operation. Concerning the clinical observations, much more could be said than I am disposed to say now. I could relate and review, for instance, the opinions of the various operators regarding this operation. I prefer, however, to define the cases or pathological conditions in which I consider it ought to be performed. Before doing so, it may not be considered out of place to state the circumstances under which it ought not to be performed. No one ought to operate until he has made an exhaustive examination of the case. It ought never to be performed as *dernier ressort*, i.e., having subjected your patient to the routine of treatment without success, you conceive the notion of puncturing the membrana tympani, to give him a last chance. All this sounds like ridicule, but experience has shown the necessity of making the remark. Should it be performed in a case of impermeable closure of the Eust. tube, that being the only morbid condition in the organ? If such a case is to be found, which I hardly think possible, I would perform the operation, if I could ensure two things; a permanent opening in the membrana tympani, and no sympathetic inflammation or irritation of the tympanic lining membrane. But as it is impossible to en-

sure a permanent opening, impossible to guard against all the dangers likely to accrue to the lining membrane of the tympanum whether the opening is temporary or permanent I would not perform the operation in such a case.

The endeavours to render permanent the opening made in the membrana tympani, in cases in which this operation has been performed, have called forth no inconsiderable display of the inventive faculty of members of the profession practising this speciality. We have Fabrizio, with his ingenious but dangerous drill, Bonnafont with a silver tube, Toynbee with a flap operation, Vontröltzch with a crucial incision, Politzer's eyelets of vulcanized india rubber, Gruber's myringotome, Voltolini's galvano-puncture, and last, Wreden, of St Petersburg, devising an instrument to remove a portion of the handle of the malleus, hoping in this way to overcome the reproductive power possessed by the membrana tympani. All in vain, however, and it is well. Apart from the more than doubtful propriety of the proceeding; because if you have a permanent opening in the membrana tympani, *whether the result of art or disease*, you have, at one time or other, active inflammation in the middle ear, and all the dangers which such a condition implies.

I do not intend to take up your time entering into a description of the pathological states in which the operation ought to be performed, because it is impossible to describe in words, the varied appearances which the membrana tympani presents in these states.

Briefly stated; whenever in any case you are satisfied that the tympanum contains anything in the nature of a foreign body, don't hesitate to operate and remove it if possible. Concerning the mode of doing so, and the proper site in which to do it, I refer you to a paper of mine in the *Glasgow Medical Journal* in 1872. If there is no such body do not operate. To this rule I have only one exception to make, I refer to the acute stage of Exanthemal (Scarlatinal) Katarrh, in which the rapid course of the disease warrants the incision of the membrane, so soon as the slightest con-

gestion of the middle ear makes itself apparent. In acting thus, you anticipate, by a few hours, the full violence of the disease, save the organ, and, not unfrequently, even the life of the patient.

I will relate, briefly, the clinical histories of some typical cases, which have been placed under my care.

CASE I.—*General Otitis*. P. B., aged 34, previously in good health. For several days past has had severe pain in ears and great deafness. On examination his case proved to be one of double general otitis, all the structures of both ears were in a state of acute inflammation. The mastoid process tender, sharp concussion over this region eliciting deep seated pain in the mastoid cells, the ext. meatus almost occluded by the concentric swelling of its soft tissues, which are very sensitive, and for these reasons barely permit of the membrana tympani being seen; the small portion of this latter visible showing it to be involved in the general mischief, its epithelial surface being villous, deeply congested, and no part of the malleus visible. The Eust. Tubes so sensitive that with difficulty a complete examination of the case could be made; such as it was, however, it showed that the middle ear was participating in the general inflammation of the organ; add to all this, the dreadful pain constantly present, but reaching its height during the night, and preventing sleep, the violent delirium at times, and the almost complete deafness, to articulate sound, and you can readily conceive in your mind's eye, the character of the case we had to manage. The diagnosis was not doubtful, nor the danger to the life of the patient overlooked. Free local depletion and full opiates were administered, together with other recognised antiphlogistic measures, and it was suggested to have him removed to town next day, which was accordingly done. When seen next day, he was somewhat easier. The membrana tympani was now rather better seen, and its appearance indicated the necessity of performing parakentesis, not only to give relief to the tympanitis, but to restrain the morbid processes in the other parts of the organ within manageable limits, and

to anticipate what was likely to take place, viz., ulcerative absorption and extensive destruction of its structure. The operation was accordingly performed, large quantities of muco-pus of a tenacious character being removed, with marked relief, to all the symptoms in a few hours. This was done to both ears. He came under care in the condition I have just attempted to describe to you, on the 22nd Feb., 1873, and on the 8th of the following month, *i.e.* 14 days thereafter, having in the meantime had the operation I refer to performed several times, and much muco-purulent fluid removed from the tympani, he was able to hear my test watch at 28" on the right, and 24" on the left ear, while to articulate sound he was normal. He had no complaint, and returned to his home in the country.

CASE II. The next case, A. P., aged 19, in previous good health, was one of simple mucous catarrh of the tympana and Eustachian tubes, of two weeks' duration, and only remarkable in not having a single sign of active disease. Of course, the usual symptoms indicative of this form of aural disease were present, but the patient had not suffered from pain at any time during his illness, and there was no congestion of the tissues visible. The hearing for speech was much diminished, loud monosyllables being heard not further off than 4 feet, and the watch at 1' from either ear. Between the date of his first being seen, viz., 23rd March, 1873, and the 3rd May, 1873, he was operated upon several times, large quantities of yellowish tenacious mucus being removed from both the ears. On this latter date he was dismissed perfectly normal in the hearing power.

It requires to be explained, as accounting for the greater length of time this patient was under treatment compared with the former case, that, on each of two occasions, after operating, secondary inflammation of the membrana tympani and tympana occurred, necessitating other treatment for its removal, and, of course, a temporary suspension of the special measures.

It is rather remarkable, that the class of cases of which this one is typical, are prone to this accident following the

operation; sometimes even endangering the patient's life. On the other hand, I have never failed to find a marked diminution of all the violent symptoms follow the operation, in cases similar to the one I first related. My own personal experience of Mr Hinton's practice enables me to state, that he very seldom, almost never, has this accident following his operations, while the freedom with which he handles the middle ear and the membrana tympani would astonish those who saw it for the first time.

Professor Schwartz, the reviver of this operation, has personally informed me, that at least 20 per cent. of his cases are seized with this dangerous after complication, of which I had several examples brought under my notice while his guest in Halle, studying the operation.

I do not attempt to explain or reconcile the practice and experience of those eminent men. Hinton uses more freedom and greater force in all he does in the cases under his care; both the gentlemen named operate with equal dexterity. Hinton's cases, on the one hand, were all very chronic, while Schwartz's were less so. Neither age nor social position seemed to be the explanation; in both clinics the patients were of the class of persons usually seen in the private consulting rooms of such men.

CASE III. Is related to show the advantages of the operation in arresting even imminent rupture of the membrana tympani. The patient, who was aged 40, had been ill eight weeks before coming under care. The disease was of the same nature as in the former case, with the addition of sub-acute myringitis. The loss of function was greater, the watch being heard on the right, 1"; on the left ear light contact; very deaf to articulate sound. The chief interest, however, lay in the remarkable appearance to be seen in both membranes. In the centre of each of the anterior segments of these structures could be seen the tissue about to give way before the pressure of the contained fluid. Evidently the interior epithelial layer, and one or both of the fibrous laminae had given way, and the external dermoid and epithelial layers alone kept up the integrity

of the membranes. Parakentesis in the posterior segments, for obvious reasons, was at once performed. A large quantity of straw-coloured, syrupy fluid gushed out, with immediate good results.

From 12th January till 8th February, he was several times operated upon, and dismissed on the latter date, with no defect discoverable either in the tissues or the function of the organs.

It is not necessary to multiply cases. Those related will sufficiently show the advantages of the operation, and justify in some degree the critical remarks which I have ventured to make.

VI.—ON THE POISONOUS AGENTS FOUND IN COLOURED TAPERS.

By JAMES MACFARLANE, *Chemist, St Andrews.*

Condensed from a Lecture delivered to the Chemical Section of the Philosophical Society of Glasgow.

It is surprising in these days of Sanitary Reform that the subject of Arsenical and other poisonous pigments has attracted so little attention, the more especially as the use of these for "manufacturing," and even for what might strictly be called "domestic" purposes, seems to have increased considerably of late years.

The use of arsenic greens is becoming so wide-spread that, unless the legislature interferes, it will soon be almost impossible to enumerate the goods coloured by them. Even now it is very difficult. Among the articles so coloured, might be named toys of all sorts, including small air balloons, Noah's arks, &c., tarlatans, ladies' head dresses, wax leaves, flowers and fruits, wax and other green coloured baskets, advertising letters, green papers of various sorts and used for such purposes as wall papers, jelly-pot labels, night-light wrappers, wrappers for confectionery, and for show cards, coating of wooden cased crayons, wafers, tinted envelopes, cigar and pipe lights, toy paints, and for distemper painting. Arsenical paper bags are said to be used to convey tapioca and other groceries, but I have never seen any.

During the summer of the past year, my attention was drawn to the subject of coloured tapers, by Mr R. R. Tatlock, F.R.S.E., F.C.S., as one worthy of attention. From the green colour of the tapers and the alliaceous odour evolved during their smouldering when blown out, it had been long surmised that they were coloured by Scheele's, Schweinfürth or Brunswick green. No experiments seem to have been made to establish its presence in an article of so much use. At the time when my analyses were begun I was not aware that anything had been written on the subject, but on searching the literature relative to arsenical papers, I observed that Professor Davy, of Dublin,* had tested a piece of wax candle. But beyond a test for mere confirmation, nothing further was attempted, and it is far from improbable that the few lines then written and placed among other analyses in a society's journal, have now been entirely forgotten. Among the wax tapers at present manufactured, there may be mentioned red and green as being the most decidedly objectionable under ordinary circumstances; but in some cases, the yellow might be added. I shall consider each in turn.

1st. *Red.* The colour alone of these tapers would suffice to convince any one of the presence of mercury. The samples selected were an average of the lot purchased, and in general amounted to $\frac{1}{3}$ rd., the selection being from three different varieties of wax tapers which gave on analysis the following results:—

a. "Spiral"—Vermilion, 1·66 per cent. or nearly ·50 grain per taper.

It is very probable in this analysis, as also in the subjoined, that the vermilion is stated much too low, and this owing to circumstances which could not be avoided.

b. "Intermediate"†—Vermilion, 1·80 per cent., or ·37 grain per taper.

c. "Plain"—Vermilion, 1·93 per cent., or ·28 grain per taper.

* *Journal of Royal Dublin Society.* Vol. iii., p. 268.

† A provisional term for tapers examined, which were slightly twisted or indistinctly spiral.

From the above it will be observed that the per centage varies from about one and a half to two per cent., and from what follows, that as the average weights decrease the per centages increase. Various other data were taken, among which might be mentioned the time occupied in burning, and the weight, which were as follows:—

	SPIRAL.	INTERMEDIATE.	PLAIN.
Time occupied in burning, .	17 min.	14 min.	12 min.
Average weight of taper, .	29·93 grs.	20·52 grs.	14·35 grs.

The ash remaining after burning was in the case of the “spiral tapers” about ·05 grain in weight, and that from the “plain” about ·02 grain (in both cases derived from the wick). If we now summarise these data, we find that as the weight increases vermilion decreases.

	SPIRAL.	INTERMEDIATE.	PLAIN.
Time in Burning, .	17 min.	14 min.	12 min.
Average weight, .	29·93 grs.	20·52 grs.	14·35 grs.
Vermilion, per taper, .	·50 “	·37 “	·28 “
“ per cent., .	1·66 “	1·80 “	1·93 “

I need hardly dwell upon the injurious effects which might follow the inhalation of mercurial vapours arising from the red tapers.

2nd. *Green.* A convenient test for the presence of arsenic in these tapers may be applied as follows: Hold over the flame of the taper to be tested a cold glazed porcelain plate at such a distance as to be just out of reach of the smoke. After the lapse of a few minutes enough arsenious acid will have deposited to enable the operator to detect its presence by any of the “three liquid tests,” or, if preferred, the deposit may be washed off the plate by a fine jet of water into a test tube and examined according to Reinsch’s process. In the case of the green tapers only one kind—the spiral—was examined and analysed quantitatively, but all the varieties that could be had were tested, and, as was supposed, arsenic was universally present. Upon analysis the spiral tapers gave:—Arsenious acid, 1·80 per cent., or ·55 gr. per taper; time in burning, 17 minutes; ash metallic,

consisting of mixture of oxide of copper and metallic copper. Average weight of taper, 30·86 grs.

It was estimated that the "intermediate" and "plain" probably contained about 2·0 per cent. and 1·5 per cent. respectively of arsenious acid.

Various other colours were examined, but no injurious matter was found. It is impossible that serious consequences could ensue from the combustion of the yellow tapers (which are coloured by chromate of lead), but in some cases, such, for example, as in the event of children sucking them, a not uncommon occurrence, bad effects might follow.

The yellow, blue and white tapers are harmless, the colouring matters being chrome yellow and ultramarine. While making these investigations, a dark green suspicious looking wick was examined for arsenic, but none was found. The colour being as rich as that of arsenic green (only a little darker) it might be used in its stead, as it was due to a compound of chromium, the tapers would be entirely innocuous.

Having proved poisonous matter to be present, let us look but briefly at its effects. At the outset we are met by the question, "Even supposing the quantity found (of arsenic more especially) were volatilised, what hurtful consequences would arise?" All the arsenic present in that portion of the taper which was burnt would certainly escape into the air, but while it is not to be supposed that the quantity present in a taper or part of a taper would instantly kill any one, neither is it to be supposed that the vapours arising from a burning taper or candle could be breathed with impunity. Dr Frazer, of Dublin, states that "minute, though far from homœopathic doses, produce in the human frame symptoms by which they may be easily detected, these being dissimilar in many respects to those produced by larger doses." All matters coloured by arsenical pigments are objectionable, but few more so than wax-tapers. When we remember that a quantity of about half a grain of arsenic produces alarming symptoms,* when taken in the solid state, how much

* Dr. Tanner's "Memoranda of Poisons," p. 55.

more, or rather in what higher degree would the symptoms be manifest when the poison was introduced into the system in its most virulent form—that of a vapour! A great many conjectures might be made as to the proportion of gas to the solid necessary to produce given effects, but I think it will be readily granted, keeping in view the extreme insolubility of arsenic, that that proportion would be as 1 : 4; in other words, if four grains be taken internally as the white crystalline solid, and be found to produce in a given time certain definite symptoms, one grain in the form of gas would produce in the same time (if not sooner) identical symptoms—identical, at least, to a considerable extent, for gases have never precisely the same physiological effects as have solids. (Instead of outstretching the limits, I feel, if I have erred, I have done so upon the safe side.) Let us further consider this proportion. The solubility of arsenic in cold water is about one part in 4·37 (Dr Tanner). If taken in solution then, we should, accepting the above estimate, require to administer about two ounces of a saturated solution of arsenious acid in order to produce death in an adult. If, again, we take the poison in the solid state, we have never more than one ounce of gastric juice in the stomach at any one time, except during chymification, and we have no data to decide whether arsenious acid is more soluble in pepsin* than in water. It is, I believe, generally understood that instead of passing directly into the blood-vessels of the stomach by solution and subsequent absorption, arsenious acid causes extreme irritation at the points of contact only, thereby inducing a flow of gastric juice towards that particular centre, by which means it is brought into contact with the blood circulating in the walls of the stomach. In some cases ulceration ensues, and in cases still more rare, perforation of the mucous lining is observed. In fine, all the symptoms are those of a “specific irritant,” and do not arise directly from “blood poisoning.” In chronic poisoning we have languor, sleeplessness, and convulsions, nervous irritability, emaciation, and catching and painful

* An experiment to test this will be tried and recorded in next paper.

respiration, and effects generally resulting from nerve action. In a broad sense I may say that solid arsenic poisoning is the result of sympathy, gaseous arsenic poisoning being the result of direct absorption.

If, in the third place, we inhale the vapours of arsenious acid, the particles will be brought sooner into contact with the circulatory system than if it were solid, although its action upon the nerves would be proportionately less, in degree.* From these facts, together with many others for which I have not space, I infer that the proportion given is in the main correct. The very existence of gaseous arsenical compounds diffused through the air, and more especially that of a sick room, is highly objectionable, and ought not to be tolerated by any one having the remedy in his own hands. I cannot bring forward in support of what I have written any cases of actual poisoning from these sources; but they are to be none the less avoided because of that, for the poisoning might be a slow poisoning at the best—involving not death but ill-health. Our highest toxicological authority, Dr Alfred Swain Taylor, has pointed out the danger arising from the smouldering of a small piece of arsenically coloured paper which had been used to wrap a box of night-lights. The effect, upon the workmen, of the green pigment used in the preparation of these tapers will be treated of in the sequel.

There is no reason why coloured tapers, and certainly much less those coloured injuriously, should be used, except merely because they “please the customer and attract the eye,” or still more probably, please the eye and attract the customer.

* Since writing the above, I have become acquainted with Dr Hind's letter in the *Medical Times and Gazette*, Feb. 14th, 1857, on the *modus operandi* of poisoning with gaseous (?) arsenious acid which coincides with my experience.

VII.—CASE OF PURULENT OTITIS FOLLOWED BY FACIAL PARALYSIS,
AND TERMINATING IN PYÆMIA AND DEATH.

By THOMAS H. GARLAND, L.R.C.P., Ed., *late Honorary Surgeon to the
Hokitika Hospital, New Zealand.*

IN the latter part of October, 1870, R. A., barrister, aged 35, called on me, complaining of discharge from his right ear. He was a well-built muscular man, of six feet in height, weighing from 12½ to 13 stones; was a bachelor living by himself, two miles from Hokitika; was studious, and, in fact, at this time, worked very hard. He was also a great walker, making it a rule to go out for a twenty or thirty mile ramble at least once a week. He had suffered from this discharge more or less since an attack of scarlet fever in childhood, but during the last ten years had noticed that he was gradually loosing his hearing, and was now quite deaf of right ear.

On examination I found a considerable amount of purulent matter, and the whole meatus filled by a polypoid growth; passing a probe round it, I found it was attached to the upper and back part of the middle ear. A pair of forceps and a good twist soon removed it—removal being followed by free hæmorrhage, which, however, yielded to cold water injection. A plug of wool was inserted, and directions given to syringe every few hours with tepid water, and to see me again in three days. At next visit he expressed himself relieved, and was under the impression that he had regained a slight amount of hearing; the discharge was thin and small in quantity. I found the membrana tympani was completely gone, but the middle ear appeared healthy, the mucous membrane being of a fresh pink colour. Ordered to syringe night and morning with solution of alum, 1 gr. to ounce. This was continued for a week or two, during which time I did not see him professionally, but constantly met him in business and in society. He then told me, and repeated it frequently during the ensuing summer, that the discharge was quite arrested, and that, excepting the loss of hearing, he did not know of anything

being the matter with the one ear more than the other. He left off the injection, and the ear ceased to be a subject of conversation when we met.

On Monday, 27th March, 1871, I was sent for to see him, and found him in bed with his head tied up. He told me that the previous Saturday he started for his usual walk, that he missed his way; night came on, he got bushed, and had to camp under a tree; rain commenced, and put his fire out, his only shelter being the few boughs that he could break down and collect in the darkness; that he had to stand in the rain until daylight, when he found his way to the house of a friend, some eighteen miles from home. There he went to bed until afternoon, and then walked home, feeling no worse for his adventure, until the middle of last night, when he awoke finding the right side of his face numb and great pain in back of his head. He aroused his housekeeper, and got hot fomentations to his face and neck. I found him with complete facial paralysis of right side—line between right and left side of face strongly marked, tongue *not* affected; examined the ear, and found meatus perfectly dry, no appearance of mischief there. Feeling confident that the seat of it was in the temporal bone, I applied blisters all over right side of head, put setons in the neck, and ordered a calomel purge and fluid diet. The blisters rose well, and next day the sensation had returned in some degree to the face. The purge was repeated, and the setons dressed with savin. On March 31st, paralysis had almost disappeared; still there remained a certain want of control over the muscles of right side of face, a thickness of speech, and a slight falling of the lower lip. Setons and blistered surface were discharging freely, and a small quantity of thick pus was found in the meatus. This was removed by warm water, and during the day a free discharge of healthy pus took place, apparently from the seat of the polypus. April 1st. He removed from bed to sofa. On the following days his condition was much the same as described, except that he was gaining strength, and the discharge from the ear was greater every

day. Thickness of speech and slight dribbling of saliva still remained, but the general contour of the face was almost normal. On April 6th, I received a message that he was so much better that I need not go out to see him. April 7th, I was summoned early in the morning by his servant, who told me that he was called in the night by his master, whom he found in a great state of excitement and talking nonsense; he sat with him until he was quieter, and then came to me. I found my patient slightly delirious, flushed in the face, tongue and *skin moist*, pulse 120 soft, discharge from ear *stopped*, pus from setons apparently healthy, breathing slightly hurried, and now and then a short dry cough. On examining the chest I found mucous râles throughout both lungs, except in lower and back part, where the breathing was tubular, and accompanied by slight friction. Ordered hot poultices to both sides of chest, a calomel purge, half an ounce of brandy, with beef tea, every two hours, and a stimulating expectorant of ammonia and senega. I saw him again in the evening, the delirium was then absent, bowels had acted freely, breathing still short and hurried, skin *dry* and *hot*, tongue moist and creamy. I was told that he had had more than one hot and dry fit, succeeded by profuse perspiration. There was no discharge from the ear.

April 8th. He had passed a restless night, there was slight delirium, cough was troublesome, great thirst, skin moist, pulse 110. Ordered milk and beef tea *ad libitum*, provided they were given in small quantities, and to continue treatment as at previous visit. For the next three days there was no great change, except that patient was evidently getting weaker, the delirium was greater, and the discharge from setons less in quantity and thinner in character. During this time he had frequent changes from profuse perspirations to burning fever, but the tongue invariably remained moist and creamy, with a greater or less brown line in centre; the bowels were constipated, and the urine small in quantity, and loaded with urates.

On the morning of the 12th, I found a marked improvement. He had passed a quiet night, cough was still

troublesome, but expectoration was freer; it was purulent in character, and its discharge appeared to give him great relief; skin moist, pulse soft, 110, thirst diminished; in fact, there was great disinclination to food or drink; urine still scanty. Moist crepitant râles were to be heard faintly over both sides of chest, but there was greatly diminished expansion of thorax, and hurried deep tubular breathing all over left lung and base of right.

At morning visit of 13th, I found him much as on previous day, except that he was mentally depressed. At this time the paralysis had entirely disappeared, together with the dribbling and thickness of speech. Ordered a couple of glasses of good wine, some fish and jelly. In the evening I found him in a profuse perspiration, and was informed that he had a severe rigor at 4 p.m.; during the night he became violently delirious, and in the morning the facial paralysis had returned, and became more marked than it had been previously. The tongue was protruded to the left side for the first time, and during the day he had frequent rigors. The cough was almost incessant, and at times he expectorated large quantities of pus mixed with lung debris. At my evening visit it was apparent that he could not live many hours. He died at 2 a.m., April 15.

Post mortem thirty-six hours after death. Body muscular, but a good deal emaciated. There were extensive pleural adhesions, especially of left side, they were recent, and easily broke down under the hand; left lung and lower lobe of right were in a state of grey hepatisation, fluid in thorax slightly purulent, upper right lung much congested, heart, liver, and kidneys pale, but otherwise normal. Pus in small quantity in sterno-clavicular articulation (only joint examined). On removing calvarium, membranes of brain were found much inflamed, and dura mater considerably thickened, whole of right hemisphere more or less injected, veins and sinuses engorged with dark fluid blood. On removing the brain, the real seat of the mischief became at once apparent, as the sinuses of right side were all filled with pus; roof of mastoid cells quite gone; in fact, whole of inner part of mastoid

process softened and broken down; internal ear full of disorganised pus and bone debris, the internal carotid artery was, throughout the whole of its passage through the temporal, bathed in pus. The external walls of the temporal were, however, unaffected, showing that the disease had no disposition to discharge itself outwards. This part of the skull was removed, and is now in my possession.

My attention was called, a short time since, to a case similar to this, published in the *Dublin Medical Journal*, in which the death was attributed to pneumonia. I would, therefore, direct attention to the pyæmic tongue and skin throughout, the alternate rigors and sweatings, and the necessity of watching the lungs in these cases, as many symptoms were here much masked.

Reviews.

- I.—1. TRAITEMENT DES MALADIES DE L'OREILLE, &c., PAR LE DR A. COUSIN. Deuxième Edition pp. 205. Paris: 1871.
2. TRAITE PRATIQUE DES MALADIES DE L'OREILLE, &c., PAR LE DR C. MIOT, *Professor de Clinique et de Pathologie Spéciale*. pp. 464. Paris: 1871.
3. TRAITE THEORIQUE ET PRATIQUE DES MALADIES DE L'OREILLE ET DES ORGANES DE L'AUDITION PAR LE DOCTEUR, J. P. BONNAFONT, *Officier de la Legion d'Honneur, Membre de l'Academie de Médecine de Paris, &c., &c.* Deuxième Édition. Paris: 1873.
4. UEBER DAS WESEN UND DIE HEILBARKEIT DER HAUFIGSTEN FORM PROGRESSIVER SCHWERHÖRIGKEIT, UNTERSUCHUNGEN U. BEOBSACHTUNGEN VON DR F. E. WEBER-LIEL (FREDERICK EUGEN WEBER.) *Docent für Ohrenheilkunde a. d. Universität, &c.* pp 205. Berlin: 1873.

IN fulfilment of the promise with which we concluded our former notice of recent works on "Diseases of the Ear," in this *Journal* for August, 1873, we now proceed to speak of the books, the titles of which are given above.

At the outset we feel, however, that the limited space placed at our disposal is insufficient to enable us to do this in so thorough and exhaustive a manner as we could have wished; in so far as we fall short of this aim, we fail to do justice to the authors of the various treatises now before us.

For reasons, hinted at in our former article (p. 575), we prefer to look at these volumes from the stand point of the specialist, though not altogether overlooking the requirements of the student and practitioner of medicine.

To the aurists of France of a past generation, the aural surgeons of the present day owe a deep debt of gratitude, for much which makes the diagnosis and treatment of ear diseases comparatively easy and successful. What though the inventions of our French confrères were subsequently improved upon, or in some cases perhaps perfected by our German brethren, nevertheless it remains for France to claim for the genius of her sons the honour of having first introduced nearly all the important operations, and many of the more valuable diagnostic and therapeutic agents, which help to perfect the practice of aural surgery at the present time. To Guyot, to Riolan, and to Petit respectively we owe Eustachian Catheterism, Parakentesis of the membrana tympani, and trepanation of the mastoid process. Deleau père gave us in the compressed air douche a therapeutic agent of the greatest value, which, through the discovery of Politzer, has done more to advance aural surgery in recent times than any other influence we can name. Then last, though not least worthy of honour, is the veteran *savant* the author of one of the volumes which we are about to notice; the link connecting the present aurists of France with the great masters of a bygone generation, viz. — Itard and Triquet-Bonafont, to whom we are indebted for the introduction of the use of the diapason in the differential diagnosis of diseases of the labyrinth. Such a retrospect makes us approach the treatises issued by our French confrères with pleasant confidence.

(1.) Dr Cousin's handy little work has many excellencies, not the least among them being the generally clear and concise style in which it is written. Specially dealing with the treatment of diseases of the ear, the author, nevertheless introduces us to the subject proper of the work by a very interesting chapter upon the anatomy and physiology of the organ. In 59 8vo pages he has compressed all that the student need know concerning this department of his studies. Besides evidence of conciseness, this chapter affords abundant proof that the author has made himself familiar with all that has hitherto been advanced concerning the structure and functions of the organ of hearing.

Passing to the subject of the book, while we admit its general excellence, we must say that the chapters are un-

equally written, and that one or two are not up to the knowledge of the present day. Contrast, for instance, the chapter "*Moyens Hygieniques*" (p. 67) with that on "*Moyens Chirurgicaux*" (p. 100), and what we mean by unequal writing will be at once apparent. Again, the paragraph, "*De l'Electricité*" (p. 27) is surely not intended by our author to be an epitome of the present position of this therapeutic agent in relation to aural medicine and surgery? In this chapter we have no mention of Pflüger's labours or of his theory of Electrotonus; no notice of the labours of Rudolph Brenner; no estimation of the relative values of Voltaism and Volta-Faradism; no notice of Weber-Liel's labours, known long ago through the pages of the *Monatschrift für Ohrenheilk*, or of Moos; indeed no notice is taken of the labours or opinions of the highest authorities on this subject. We need say no more to show that it is behind the knowledge of the day, and that its insertion in its present incomplete state was somewhat inexcusable.

(2.) The treatise by Dr Miot is a complete and exhaustive work, in some respects, upon the subject of which it treats.

The general pathology of the diseases of the ear is first considered, then the diseases themselves, and lastly their diagnosis and treatment. We must take one exception to the completeness of the execution of this plan. Disappointed with the incompleteness of the manner in which electricity is treated by Cousin, we turned to Miot, in the hope of finding it more fully discussed. To our surprise he did not speak of it at all, except in two places, not exceeding two lines of letterpress, and there only to mention its name. This omission is not justifiable in a volume professing, as this one does, to serve the purpose of a text-book.

A treatise on Otology without an appreciative, and exhaustive consideration of the electrical treatment of some of the forms of ear disease, is almost like the play of Hamlet with the Dane left out. With this exception, we heartily recommend Dr Miot's book to the attention of students and practitioners of medicine.

(3.) The treatise by the veteran *savant*, Bonnafont, adds new lustré to the well-won fame of its distinguished author, who, still prosecuting his labours in the special department of medicine, with which his name has been so long and so honourably associated, manifests undiminished energy, by sending forth a second edition of his celebrated work. The volume before us, though ostensibly a second edition of the work published in 1860, is in all respects a new work; almost re-written, it has been increased by the addition of new matter, and brought up to the

present state of aural science. So thoroughly has all this been done that we consider this last effort of his even greater than his first. However laborious this work may have proved to its author, it was a necessary duty, for the Otology of 1860 is no longer that of the present day.

Having failed to obtain reliable information from Cousin and Miot, respecting the position which electricity holds among aural surgeons in France, and knowing that Bonnafont has a peculiar method of electrising the ear, we turned to that chapter which at present has a special interest for us, in order to ascertain what he says concerning the use of this agent, and the cases in which he applies it. After comparing the chapter in this volume on electro-therapeutics with that in the first edition of his work, we have no difficulty in coming to the conclusion that he attaches little value to this agent; further, that he has no encouraging results to record, may be justly inferred from the tone of his remarks throughout. It is somewhat difficult to define the class of cases in which he recommends the employment of electricity. From the mode in which he applies the current, and observations which he makes, it would seem to be that form of deafness which he terms "torpide," or in other words, a *true* paresis of the auditory nerve. The manner in which he directs the current to the nerve is peculiar to himself, and must be painful to the patient. It is as follows:—Passing an insulated needle (8 c. m. long by $\frac{1}{4}$ m.m. in diameter) through the anterior segment of the membrana tympani till arrested by the inner wall of the tympanum, and introducing an insulated wire into the Eustachian tube, he attaches the poles of his Volta-Faradic battery to these rheopores, and closes the circuit. How long the sitting lasts, and how often repeated, whether the current used is primary or secondary, we are not informed. As regards this mode of applying the current, we would much like to know what effect is produced upon the membrana tympani from repeated puncturings of its delicate structure every second or third day by the insulated needle, for of course the operation must be repeated, otherwise he is singularly fortunate in the selection of his cases, if one application suffices to effect a cure. This mode of electrising the auditory nerve is peculiar to the author, as we have just said, and, except in the hands of a specialist, would be difficult of execution; fortunately, however, as we shall presently show, it is an unnecessary operation.

Concerning the "cophosis torpide," without any other lesion of the auditory apparatus, we very much doubt if it exists, and when good follows the treatment recommended by the author, we suspect it is not in consequence of a stimulation of the special

nerve, as he affirms, but to a restoration of the power of the tube muscles from a paralysis to which the deafness is due. The current used by Bonnafont is the Volta-Faradic; we had thought that the superiority of the constant current in such cases had been long ago established by the labours of Reinak, the apostle of Voltaism, and those of Oppoltzer, than whom no one has had greater experience of this form of electricity; further, Brenner has proved experimentally that the auditory nerve responds in a reliable manner to the constant current only.

What effect upon this nerve the Volta-Faradic current may have, we do not know from personal experiment, but to apply the constant current, even from a weak pile, in the manner described by Duchenne and endorsed by the author, would be unpleasant, if not dangerous.

Repeatedly we have seen severe vertigo and even alarming syncope produced by its application in the way described, viz.—by applying the rheopores to the external ears. Pflüger has shown that a current, even though weak, if passed through the cerebrum, at right angles to the long diameter of its axis, causes all the symptoms mentioned above; and a strong current may, he says, cause lesion of tissue within the head. Brenner's more recent experiments quite confirm what Pflüger had previously advanced. We may say, indeed, that Voltaism and Faradism have each their special virtues as therapeutic agents in aural medicine. In properly selected cases of ear disease they are powerful and certain remedies.

After the erroneous deduction made by Philipeaux of Lyons, and repeated by Duchenne (*Surdités curables. Bull. de ther. 1857, p. 458. Also, De l'électrisation localisée, 3rd édition. Paris: 1872*) that the sensations experienced in the edge of the tongue, on electrification of the chorda tympani, were diagnostic of activity of the auditory nerve, we were prepared to find in the writings of our French brethren some vagueness in the description of the cases of ear disease in which electricity is useful, and some empiricism in the selection and mode of applying the current. The work by Bonnafont, though not free from this blemish, is yet more so than the other volumes we have just noticed.

There are several other points in this able volume to which we might, if captious, take exception, but they are submerged in the general excellence that characterises the work, and we pass them over without remark.

(4.) The volume by Weber-Liel—the distinguished Aural Surgeon of Berlin, and co-editor of the *Monatschrift für Ohrenheilkunde*—is, as he tells us, the result of several years'

experience and observation of a disease not previously described—at least from his theoretical stand-point. Its existence, however, is not denied by other authors, as might be inferred from the tone of some of his remarks; on the contrary, it has been long recognised by them, and generally regarded as incurable. On this account, perhaps, till now, it has not been investigated by them with that method and precision which characterise the labours of our author. Approaching the examination of a difficult subject in a philosophical spirit, he has sought, by original investigations, to know the nature of the disease, and its primary cause; and, having found it, as he thinks, to rest his theory as to the development of the disease upon anatomical, physiological, and pathological facts. The result is a book which is creditable to the genius and industry of its author.

The disease which he discusses under the name of "*Die progressiver Schwerhörigkeit*," is the same which has been variously styled by British and Continental authors, as Dry Catarrh of the tympanum, Sclerosis of the lining membrane of the tympanum, Chronic tympanitis, Chronische paukenhöhlen Katarrh, Trockener mittelohr Katarrh, Catarrh de la caisse sèche, L'inflammation chronique de la trompe et de la caisse, L'inflammation interstitielle de la caisse, etc., etc., and is characterised by two prominent symptoms, viz., the gradually increasing loss of function and subjective sensations of noise in the ears. So far the author of the book before us, and other writers upon aural medicine, are agreed.

When we come, however, to consider the etiology of the disease, we find the author at variance with all previous writers; nor could it well be otherwise, for while they regard the essence of the morbid changes to be a primary plastic inflammation of the lining membrane of the tympanum, in which the inflammatory deposits exuded are retained in the tissues and become, in course of time, converted into fibrous tissue; our author considers them as secondary to a primary change in the auditory muscles, by which their balance is at first disturbed, and in course of time destroyed. He further holds, that the treatment of the local morbid changes in the tympanic membrane, upon which other authors lay so much stress, is useless in many cases, till the equipoise of the muscles is restored, and then oftentimes is not necessary by reason of the improved tone of the vaso-motor nerve supply, which results therefrom.

This is no new thing to ourselves, for long ago, in cases which presented the two symptoms already pointed out, we had noticed a common history indicative of a primary change in the tube muscles, and had adapted our treatment thereto.

To Weber-Liel belongs, so far as we know, the merit of having first pointed out the relationship between this acinesia of the tube muscles and the other symptoms of this form of disease of the ear.

As this work is addressed to specialists, and not to students or general practitioners of medicine, our author assumes the possession of special training on the part of his readers to a full and appreciative comprehension of the subject of which he treats, and for this reason we shall epitomize what he has to say.

Proceeding to the discussion of his subject, after some general introductory remarks, he speaks of the disturbances of motor power that occur in the naso-pharyngeal muscles, as the occasion and continuing cause of this form of deafness. Then the natural history of the disease is fully and fairly noticed, after which he discusses in a thoroughly scientific spirit the anatomical relations of the Eustachian tube and its muscles to those of the tympanum, as well as their physiological relations to each other, and to the function of the organ.

The etiology of the disease is next considered, and the results of several *p. m.* examinations given, which serve to establish the position of the author.

The treatment of the disease is most fully considered, and may be summed up in saying that its principle is restoration of the tone of the sub-paralytic muscles by general and local tonics and stimulants, chief among them being the alternate use of the constant current to the tympanic muscles, and of Faradism to the muscles of the naso-pharyngeal region and of the Eustachian tube, and, as a *dernier ressort* for the relief of the distressing tinnitus, from which the patients nearly always suffer, the operation of tenotomy of the tensor tympani muscle, an operation devised by the author.

In conclusion, while we do not subscribe to everything which the author has advanced concerning this intractable form of disease of the ear; we readily admit that he has broken new ground by his investigations, which are conceived in a philosophic spirit, executed after a scientific method, and worthy of the highest commendation.

II.—ANIMAL PHYSIOLOGY. By JOHN CLELAND, M.D., *Professor of Anatomy and Physiology, Queen's College, Galway.* London and Glasgow: William Collins, Sons & Co. 1874.

THE faculty of writing clearly, simply, and intelligibly upon abstruse subjects, is one which is possessed by a very small number of persons; hence, although many attempts have been made to render the problems of physiology intelligible to "readers previously unacquainted with anatomical details," only one or two of these can be said to have been really successful. The present volume, although bearing evidences of great care in compilation, and although much fuller and more complete than any other on the same subject, is yet wanting in that simplicity which alone could render it fit for those students for whom it is specially written—those, namely, who are preparing for the examinations of the Science and Art Department of the Privy Council. What can such students, for instance, understand of the following?—

"When the arterial resistance is great, as it is in the most robust health, it counteracts the distending impulse given by the heart, so that the rise of the tracing is not so considerable as it would otherwise be; and in these circumstances there is a moment's continuation of the distension, then a gradual but slightly undulating descent. But when the arterial resistance is slight, the secondary distending impulses given by the elastic recoil of the larger vessels produce more effect on the tracing, and one particular rise becomes prominent, which appears to be caused by the walls of the commencement of the aorta, re-distended by the blood thrown back on the aortic valves, again recoiling. Such a pulse is said to be *diastolic*."

Again, what lasting knowledge will they obtain from the discussion of the hypoaria of fishes, the note on the homology of the cerebro-spinal nervous system, and the pre-oesophageal ganglion of the Annulosa, or even the description of the Wolffian bodies? Although the author's original researches on the last may, perhaps, excuse their being mentioned.

The book is certainly better adapted for the second purpose mentioned by Dr Cleland in his preface—namely, "to serve to the junior student of medicine as a compendium of physiology, which may assist him to obtain a clear idea of the principles of the science, and prepare him for the perusal of works more elaborate in character;" but in this respect also it falls short of what we think is required. We regret this exceedingly, both because a manual of physiology adapted for medical students has long been a *desideratum*, and because in many of the chapters in the present volume the author shows so great a capacity for the work that we

are sorry he did not turn his attention more exclusively in that direction. But medical students are expected to know that saliva contains sulpho-cyanogen, that the chorda tympani nerve is somehow connected with the sense of taste in the tip and sides of the tongue, that the posterior columns of the spinal cord play an important part in the co-ordination of muscular movements, and that the secretion of the submaxillary and sublingual glands differs from that of the parotid; none of which facts receive any mention in the present volume.

While thus holding that Dr Cleland has failed in both the aims he had in view, we are by no means blind to the sterling merits the book possesses. The chapter on the senses is a capital account of a most interesting subject. It is brief, readable, terse, well put together, and sets forth worthily all the most recent discoveries; so that any reader of it will obtain more trustworthy information of the organ of Corti, the cones of taste, and the olfactory cells, than is possessed by nine out of every ten (we might, perhaps, say ninety-nine out of every hundred) physiology students of the second year.

A chapter on development is rather a new feature in a work intended for the perusal of non-scientific readers, but we are sure that the most fastidious will find nothing objectionable in the one before us. We feel that we must congratulate the author upon his intrepidity in despising prejudices which even so redoubtable a soldier of science as Professor Huxley was not able to withstand.

We cannot in any measure sympathise with the author in his positive denial of the truth of the theory of the localisation of certain faculties in different parts of the brain. The question is at present *sub judice*, but such assertions as, "There is no foundation for such a supposition," and, "On the contrary, the evidence points to an opposite conclusion," are especially unfortunate at the present time, when the experiments of Ferrier in England, of Fritsch and Hitzig in Germany, and of Dupuy in France, have shown that certain definite actions have (to say the least) an intimate connection with certain convolutions, or parts of convolutions. A like dogmatism is displayed in the description of the muscles of respiration, for the author holds the Continental idea, that both the external and internal intercostal muscles are inspiratory, and only alludes to the "English theory" in a foot note, "that the student may be warned against it as an error." And this, after the experiments of

Onimus, wherein he showed by means of electricity, that the external intercostals raise the ribs and are inspirators, while the internal depress them and are expirators!* Has the appeal to direct experiment no weight in Dr Cleland's eyes?

We naturally turn to the minute anatomy of the liver, to see what view is adopted as to the termination of the biliary ducts in the lobules, and know not whether most to admire the boldness of the attempt, or to smile at the utter failure, when we find the author trying to reconcile the theories of Chrzonzczewsky and Beale. No theories can, to our mind, be more opposite, as the former observer believes each individual cell to be surrounded by a duct, while the latter holds that each duct contains a multitude of cells. We should add, however, in explanation, that Chrzonzczewsky's ducts are here spoken of as intercellular channels, although it is at the same time admitted that they have a definite wall.

The description of the skin and its appendages is most excellent, and includes a description of the erector muscle of the hairs, a structure, which has till lately, received less attention than it deserved.

The illustrations are for the most part good, and reflect great credit both on Dr Cleland, and on our townsman, Mr Stephen Miller, by whom they were engraved. But we must take exception to the sketch of the tongue (page 225), which is very weak and ineffective, and to most of the diagrams of the eye and ear, one of these (p. 229), looking more like intaglio than (as it is intended) relief. The queer animal on page 39, might well have been spared, or the author might have treated us to something less resembling an artist's lay figure.

We are glad to recognise the diagram of the gray matter of the convolutions as one which Dr Cleland contributed to the Quarterly Journal of Microscopic Science, especially as we have long regretted the small interest which histologists seemed to take in the admirable paper which it was designed to illustrate.

With all its defects and shortcomings, the book contains remarkably few errors, and bears evidence on every page of the labour which has been expended on it. Notwithstanding the strictures we have thought it necessary to make, we are convinced that all medical students will do well to have the book in their possession, as, although not to be depended on alone, it will form an admirable *addendum* to the somewhat antiquated text books at present in vogue.

* Report on Physiology. Journal of Anatomy, November, 1873.

III.—CONTRIBUTIONS TO PRACTICAL SURGERY. By G. W. NORRIS, M.D.
Philadelphia. 1873.

DURING the past few years there have been issued from the medical press of America, several works on surgery, some of which are of high value and have deservedly found a place in the libraries alongside the standard works of Erichsen and Holmes.

The contributions to surgery, however, now under review, though interesting, and in many respects useful, have no such pretensions. They are simply a collection of essays, some of which have already appeared in the pages of the *American Journal of Medical Science*, and to prevent the intentions of the author from being misunderstood, we are informed in the preface, that they are reprinted for "reference and comparison with more recent investigations." That there is room for such comparison, as the author here contemplates, the reader will have no difficulty in discovering for himself.

The subject of the essays may be shortly stated thus,—on the occurrence of non-union after fractures—on the treatment of fractures, simple and compound—on amputations and the mortality therefrom in the Pennsylvania Hospital—and lastly, on the mortality following ligature of arteries. It may be remarked generally of these essays that they are accompanied by very elaborate statistical tables, the compilation of which must have necessitated great labour and research, as the medical records, not only of America, but also of Europe, have been ransacked in order to supply the greater part of the author's materials.

In the first essay the causes and treatment of non-union after fractures are discussed at great length, and although we cannot say that the author has given us anything very new, yet we should not be doing justice to him, were we omitting to point to the fact that, after making due allowance for errors, which almost invariably creep into statistical tables, and which render conclusions from them frequently more favourable than they should be, the figures clearly show that a greater amount of success has followed the use of the seton than of any of the other methods now employed by surgeons to promote the consolidation of ununited fractures.

There is, however, a judicious caution given—one with which we entirely agree, and that is, that in the treatment of ununited fracture no exclusive method should be adopted, and that in making choice of a plan of treatment, we should

be guided by the special circumstances of the case, such as the situation of the injury—"whether near a joint or otherwise, the limb affected, the length of time the fracture has existed, the degree of mobility existing in the fragments, whether the fragments be in apposition or otherwise, and how connected." Having duly considered these points, the surgeon is then in a position to decide upon the plan of treatment likely to give satisfactory results; and we might add here that a careful perusal of this essay would greatly aid him in making the selection.

The essay on compound fractures is not one from the study of which we derived either pleasure or profit. After referring to the frequency of such injuries, the various complications, and the important questions which may arise, the author tells us that he has no aversion to poultices, and his knowledge of the antiseptic measures now so successfully employed in the treatment of compound fractures, is to be found in the remark "that carbolic acid is of service as a disinfectant, and tends to drive away the flies." Truly there is room for comparing the surgery of the past with "the results of more recent investigations."

On the subject of the statistics of the mortality following the ligature of arteries our space forbids us to enter. And we lay down the book, which is nicely printed on fine toned paper, with the recommendation that it is one worthy of a careful study, and a place as a work of reference in the library of the surgeon.

IV.—THE ANATOMY OF THE LYMPHATIC SYSTEM. *By E. KLEIN, M.D., Assistant-Professor at the Laboratory of the Brown Institution, London.*
1. THE SEROUS MEMBRANES. London: Smith, Elder, & Co., 1873

THE great delicacy of the walls of the lymphatic vessels, and the extreme minuteness of their ultimate ramifications, has, up to within a very recent period, stood in the way of their successful investigation, the former circumstance precluding the possibility of minute injection, and the latter carrying them beyond the range of all but the highest microscopic powers. Now, however, that the distinctive character of the epithelial lining has been established, and that lining easily demonstrated by the aid of nitrate of silver solution, much progress is being made in this department of Histology. Already, we have had important memoirs by Recklinghausen, Schweigger-Seidel, Dogiel, Rollett, Ludwig, Burdon - Sanderson, and others, but never

before have there been recorded so extended a series of observations, or so complete a history of the lymphatics of any tissue as the one before us of the lymphatics of serous membranes.

Our author divides his essay into two parts; the first of which, treating of the normal structures, has an especial interest for anatomists and physiologists, while the other, describing the same structures under the influence of inflammation, appeals more directly to the sympathies of pathologists and practitioners of the "art of healing."

The normal structures may be divided into two great classes.

1. Cellular elements, including both those found on the surface of the membrane, and those which help to form the mass of its substance, and 2. Channels, canals, or cavities, which serve for the transmission of blood or lymph, or form communications between the surface of the membrane and lymphatic capillaries.

These we shall briefly summarize, as they are given by Dr Klein, leaving our readers to draw their own inferences on the facts thus laid before them.

I.—Cellular Elements of Serous Membranes.

a. Common flat endothelial (epithelial) cells of the serous surface; having a wavy outline, and being transparent and apparently structureless.

b. Germinating endothelium, occurring in small groups of cells on the surface of the membrane, generally in the neighbourhood of the *stomata*. The cells are composed of granular nucleated protoplasm, which when irritated grows very rapidly, so that large masses are produced which project from the serous surface (*lymphangeal nodules*). By the proliferation of this endothelium also, free cells are produced, which bear a close resemblance to white blood corpuscles, but are usually smaller; they possess an ameboid movement, and are called "lymphoid corpuscles."

c. Branched anastomosing cells which are distinctly seen to occupy the cavities of the "lymph canalicular system" of Recklinghausen. These are finely granular, are more or less flattened parallel to the surface, and possess an oval nucleus and nucleolus; the nucleus as well as the cells themselves, are often constricted as if dividing, and furnish, no doubt, another source of origin of the "lymphoid corpuscles" above described.

d. Here and there the branched cells become aggregated together, and the intervening tissue much diminished in quantity, so that they lie almost side by side; in these places (which

Klein has named *lymphangeal tracts*), they are seen to be continuous with the endothelium lining the lymphatic capillaries. Within the lumen of the smaller lymphatics, more especially of those which invaginate the blood vessels, similar tracts are seen stretching from wall to wall; from their position they have been called *endolymphangeal tracts*. These form another source of origin of the lymphoid corpuscles.

II.—Channels, Canals, or Cavities.

a. Large lymphatic vessels with valves.

b. Lymphatic capillaries which have no valves, and which vary greatly in their arrangement. Sometimes they run in straight lines—this being their disposition between the tendon bundles of the central tendon of the diaphragm—in other places they are tortuous, very variable in their calibre, and having more the character of irregular spaces than of true vessels; but for their epithelial lining, which is always the same.

c. Pouch-like dilatations of the capillaries, forming what are known as *lymph sinuses*. These are lined with sinuate epithelium, and must be looked upon simply as parts of the vessel.

d. A system of irregular channels which have been named *lymph canaliculi* (Recklinghausen), and which are contained in the “matrix” “stroma,” or “ground substance” of the serous membrane; they are identical in arrangement with those described as existing in the cornea.

e. Small openings called *stomata*, which connect the lymphatic capillaries with the surface of the membrane. They are generally round, and most frequently lined with granular protoplasm. *True stomata* are found only over a lymphatic vessel, or (as in the frog) in the wall of a lymph sac.

Besides these elements, Dr Klein describes what he calls *false stomata*; they consist of gaps in the surface epithelium, through which the protoplasm of the lymphangeal tracts protrudes. In inflammation this protoplasm produces lymphangeal nodules in the same manner as the germinating endothelium of the surface already described.

A very interesting description of the development of lymphatic and blood capillaries, and of the conversion of the lymphangeal tracts into fat is here given, but unfortunately our space will not permit that we should enter on the discussion of this subject.

We confess that we are not entirely convinced as to the existence of the lymph canicular system and of the cells contained therein, on which so much stress is laid, and which

form the chief centre round which the interest not only of this present memoir but of many others on the same subject is concentrated. Our suspicion is increased by the fact that in the description of the "cellular elements of the ground substance," no mention is made of the connective tissue corpuscles, and we cannot believe it possible that these should be altogether absent in such vital and active tissues as those described. Some such suspicion, indeed, seems to have entered the mind of Dr Klein, for he takes great pains to prove that similar cells in the infraorbital gland of rabbits are not developed into connective tissue fibres, but are converted into fat cells. We shall be glad to note additional evidence on this point in the other parts of Dr Klein's work, this being, as we understand, the first of several volumes on this important subject.

Although we are inclined to set a very high value on the work before us, and to believe that (as instanced by it) the Brown Institution has already shown a greater scientific usefulness than we anticipated, we at the same time cannot suppress an expression of regret that all the microscopic investigations here detailed should be entirely "Comparative," and that the author has not given more attention to the structure of serous membranes in the *human* body. To our mind the value of this monograph is greatly diminished by this defect.

We have no doubt that we shall do Dr Klein a great injustice if we suggest that his illustrations are "too good to be true," and that it is utterly impossible for any microscopist, however accomplished in his art, to produce specimens of such beauty and such perfection as those here depicted; and yet such is the impression produced on the minds of most persons, even of those who have had considerable experience in histological investigation. Still, we believe that Dr Klein has fairly and accurately drawn appearances which he really saw under the microscope, and that the explanation lies in the fact, which we find hinted at here and there throughout the book, that he made scores of preparations before he obtained such as satisfied him.

We only wish that we had a few more observers as earnest, as accurate, and as indefatigable as the author of the "Anatomy of the Lymphatic System."

V.—A HANDBOOK OF THE THEORY AND PRACTICE OF MEDICINE. By FREDERICK T. ROBERTS, M.D., B.Sc., *Assistant Physician and Assistant Teacher of Clinical Medicine, at University College Hospital, &c.* London: H. K. Lewis. 1873. pp. 1043.

THIS volume presents the external appearance of having outgrown the dimensions originally intended for it, and the preface corroborates this idea. If this work is really to take a place as a medical text-book, we think that in future editions it must either be increased, or what, perhaps, might be better, somewhat reduced in bulk. Of the conception and the execution of the work we are glad to be able to give a good report. The chief point of departure from previous text-books is the introduction by the author of preliminary chapters (printed for the sake of distinction in smaller type) taken up with a variety of very important matters relating to whole groups of disorders which come up individually in subsequent chapters. This gives the work, to some extent, the characters of a clinical manual; the idea seems a good one, and must, we think, facilitate the intelligent study of disease on the part of the student. The treatment, as well as the diagnosis and prognosis are also in large part dealt with by the method of grouping, and this tends to prevent repetition, and to assist the beginner in acquiring a clear and comprehensive view of the subject.

The value of this handbook depends, in large measure, on this effort to bring the clinical aspects of closely allied diseases into relationship with their more formal and systematic subdivisions. The work has evidently been executed with great labour and care, and so far as we have examined certain portions of it, the statements seem characterised by such fulness and accuracy as to impress us with the idea that it constitutes a very trustworthy guide. The scope of the work does not include the citation of authorities or references, but throughout the pages a good many names are mentioned incidentally, without, however, due regard being paid to what has been called "literary perspective." For example, when at pages 121 and 122 five lines and a-half are devoted to a statement regarding the chief source of animal heat, it seems a pity to take up a part of this space by citing Dr Beale and his opinion that "the conversion of non-living into living material is the cause of the production of heat." Or, again, in dealing with the treatment of pyrexia by the external application of cold, to point out that Dr Beale thinks that this acts by diminishing the growth of bioplasm. In regard to rheumatism, we read that "Dr Wilson Fox has treated some cases by a form of cold bath, water being poured over the patient as he lay in

bed on a mackintosh, wrapped in a blanket, but this treatment does not appear to have been efficacious," p. 244. If Dr Roberts has gathered that the treatment referred to has not been efficacious, it seems a pity to place on record, in a handbook of medicine, the failure of an experiment not likely to be widely imitated, and to associate it with the name of a colleague, especially as he does not say definitely what that colleague's opinion of such treatment really is. The same remark which we made on the volume as a whole, might be applied to the citation of names and authorities—they should either be extended or curtailed.

We can recommend this handbook to the student as a piece of good work, and as supplying an excellent connecting link between the systematic treatises and the clinical manuals already in use.

VI.—1. A TREATISE ON THE CONTINUED FEVERS OF GREAT BRITAIN. By CHARLES MURCHISON, M.D., LL.D., F.R.S., &c. &c. &c. *Second Edition.* London: Longmans, Green & Co. 1873.

2. TYPHOID FEVER: ITS NATURE, MODE OF SPREADING, AND PREVENTION. By WILLIAM BUDD, M.D., F.R.S. London: Longmans, Green & Co. 1873.

ELEVEN years have now elapsed since the publication of Dr Murchison's great work on the Continued Fevers of Great Britain. In that interval severe epidemics of typhus and relapsing fever have visited every country in Europe; innumerable local outbreaks of our endemic enteric fever have been investigated by the experts of the Privy Council, and our knowledge of the etiology and treatment of that protean and omnipresent disease has notably increased. Probably no medical work ever gave a more perfect presentment of all that was known of its subject, than the first edition of Murchison on Fever. It was almost immediately put into the hands of the profession in Germany by Zuelzer of Berlin. Both the original and the translation have been long out of print. It is impossible to estimate how much of the knowledge which these great epidemics have left behind, in the shape of local monographs and special investigations, we owe to the fact that they were studied all over Europe with "Murchison" as a *vade mecum*. No incident of medical life is so confusing and so apt to be fruitless, as an epidemic; but this book has always furnished a mould

in which to consolidate and give proportions to otherwise random and indefinite observations.

When, therefore, we are told that "since the publication of the first edition, the literature of Continued Fevers has been enriched by the admirable lectures of Dr Hudson of Dublin, and by numerous memoirs by observers in this country, as well as in Germany, France, India, and other parts of the world," and that "it has been my endeavour to incorporate with the results of my experience those of my fellow-workers," we are prompted to acknowledge a duplicated obligation to Dr Murchison, first for helping observers to observe to the most advantage with the least labour, and then for gathering up their observations with so much scrupulous care, and refining them in his own *φροντιστήριον*.

We have carefully gone over every page of this new edition, with our well-thumbed copy of the first edition beside us, and we can endorse the author's statement that it "is far from being a mere reprint of the first. Many parts of the work have been entirely re-written." There are two ways of preparing a second edition; one is by simple addition and interlineation, the other is by re-writing and working up the new material into the tissue of the thought. In the former case the structure is patched and added to; in the latter it is pulled down and rebuilt. Dr Murchison has adopted the more laborious, but also the more satisfactory plan, and thus the reader will find many of the more important points in pathology and treatment discussed in a succession of short essays, which are models of clear, compact, and elegant expression. The literary merits of the second are decidedly greater than those of the first edition.

By this careful digestion of the new material, and by the use of small type for the historical parts, the additional results of four pages of bibliography are all embraced by an increase in the size of the volume of only ninety-two pages. Of this, forty-seven pages, or more than one half, are allotted to Enteric Fever. The detailed illustrative cases are increased from forty-four to ninety-three; and the phenomena of temperature, which may be said to have received no notice in the first edition, are in this fully discussed from the author's own observations, and illustrated by eleven new thermometric charts.

The function of the physician in reference to cases of continued fever was never more happily expressed than in this sentence, which appears for the first time in this edition: "A patient with typhus is like a ship in a storm; neither the physician nor the pilot can quell the storm; but by tact, knowledge, and able assistance, they may save the ship." The management of alcoholic stimulants is one of the most delicate

of the piloting duties of the physician. We are delighted to find, in those days of attempted revival of the doctrines of Todd, restored and decorated with the attractions of physico-chemical experiments, that Dr Murchison has modified his opinions in quite the opposite direction. The leader of the attack on the use of alcohol as a food was Dr Gairdner of this city, and some of the most convincing facts in support of the non-stimulating treatment of fever have been observed in the fever hospitals of Glasgow, and published in our pages. In the first edition, although Dr Murchison regarded alcohol as "a medicine which, like many other medicines, is poisonous in an over dose," his practice sanctioned the use of alcohol, without those restrictions from age, stage of disease, or limit of amount, which were advocated in Glasgow. Now, he is both clearer in his enunciation of principle, and more strict in his practice. Putting aside the discussions in which the editor of the *Practitioner* delights, as to elimination or assimilation, and falling back on his "experience of its use in fever," and on a clinical experiment which satisfied him that "the prostration was as early, and the emaciation as great with the brandy as without it (recalling the observations of Parkes which make it doubtful if it even saves the nitrogenous tissues from disintegration), Murchison at once comes to the simple clinical fact that alcohol increases the force of the heart, and promotes the capillary circulation, and from thence derives the simple clinical aphorism—"Hence, as Stokes long ago pointed out, the phenomena of the radial pulse and of the heart are the grand criteria for guiding us in the administration of alcohol in fever. When they flag, alcohol is our best and surest remedy; but when they show no tendency to fail in strength, alcohol is unnecessary, and may be injurious." (p. 287.)

The section on "Alcoholic Stimulants" (p. 286) has been rewritten, evidently with great care and deliberation; but this general statement of principles exists essentially in the former edition. If this were all that we could note, that recent discussions had not moved Murchison from his general position, the fact would still be important. But we shall endeavour to show, besides, how much his practice has changed in those eleven years. At p. 288 of the present edition, we find "rules for the guidance of others in the employment of alcohol." They are condensed and rearranged from those in the first edition, so that a comparison is less easily made, but we shall endeavour to contrast corresponding parts,—first those which indicate the general extent to which stimulation may be required as to age and period of fever.

First Edition (p. 269).

a. There are some cases of Typhus which, under a supporting diet and the mineral acids, do well without wine or brandy, at any stage of their course.

b. In few cases is wine required, or of any service during the first five or six days of the illness, but most cases require a greater or less amount at some time during the second week; and as a rule it is good practice, to commence the exhibition of stimulants about the seventh or eighth day.

c. Stimulants are required earlier, and in larger quantity by persons who have led intemperate lives, and of advanced years.

Second Edition (p. 288).

While believing that its ordinary employment as food in fever is a dangerous practice, I am certain that many cases are benefited by its occasional use as a stimulant. . . .

a. Patients under twenty years of age do best as a rule without any alcohol.

b. Most patients over forty are benefited by alcohol from the commencement of the second week of the illness, or earlier.

c. Persons of intemperate habits require alcohol earlier and in greater quantity than others.

Comments could not make plainer the contrast in the practice inculcated in those extracts. In the one, "some cases . . . do well without" alcohol "at any stage of their course;" in the other, "many cases are benefited by its occasional use;" in the one, "most cases require" alcohol "at some time during the second week;" in the other, "most patients over forty are benefited by alcohol from the commencement of the second week," and "patients under twenty" are better without it.

The other rules refer to the special indications for stimulation which, excepting rearrangement, are the same in both editions. In the hints as to the amount of the average requirements of each case, we find important modifications.

First Edition (p. 271).

"It is impossible to give any positive instructions, as to the quantity of wine or spirits, required in each case. Usually, it is well to commence with not more than four ounces of wine in twenty-four hours, and to watch its effects. It will rarely be necessary to give more than eight ounces of brandy at any period of the fever. Occasionally, however, this allowance may be exceeded, and it is astonishing to find what large quantities some patients take with advantage, who have previously led temperate lives. Stokes records the case of a man, who, in twenty-one days, consumed twenty-four bottles of wine and six bottles

Second Edition (p. 290).

"It is impossible to give any positive instructions as to the quantity of wine or spirits required in each case. It is very rarely necessary to give more than eight ounces of brandy at any period of the fever. Occasionally this allowance may be exceeded, but from my own experience I am inclined to think that the cases must be very exceptional where it is advisable to give more than twelve ounces, or half an ounce every hour. If, notwithstanding this amount, the patient die, it is doubtful if any amount of brandy would have saved him, and if a larger amount would probably only have contributed to the fatal event. As

First Edition (p. 271).—*Continued.*

of brandy, without exhibiting any signs of intoxication. In my own practice, I never see reason to exceed sixteen ounces of brandy in twenty-four hours, and I believe that the cases where this amount is required are exceptional.

"In urgent cases, the food and alcoholic stimulants must be persisted with, so long as the patient is able to swallow; and even when he can no longer swallow, the case is not to be given up. I have known cases where life appeared to be saved by frequent enemata of beef-tea and brandy, after the patient had ceased to take anything by the mouth.

"As soon as the symptoms, for which wine and spirits are given, begin to recede, the quantity ought to be reduced, and smaller doses ordered at longer intervals."

Second Edition (p. 290).—*Continued.*

soon as the symptoms for which alcohol is given begin to recede, the quantity ought to be reduced, and smaller doses ordered at longer intervals."

Turning to the section on Diet, which precedes that on alcohol, we find that a dietary on p. 254 of the first edition, in which milk is barely mentioned along with beef-tea, chicken-tea, arrowroot, and other elaborate culinary concoctions, is displaced on p. 286 of the second edition, with remarks, the sum of which is this: "Of all these forms of nourishment, I agree with Dr W. T. Gairdner in thinking that milk is the best. I have for many years been in the habit of giving it in preference to beef-tea." It is pleasant to remember that this practice, both as to feeding and stimulation, has been taught in Glasgow University, and followed in the principal epidemic hospitals of the city since the year in which Dr Murchison's treatise on Continued Fever first appeared. A fever patient requires but little cookery during the acute stage. There is nothing so astonishing as the mis-spent pains which are encouraged by private practitioners in the production of soups—white, brown, and clear—teas of beef and chicken, and other devices of the cook, to the exclusion of milk, and in enteric fever often as the sole cause of a diarrhoea, on which a play of drugs is kept up through mouth and rectum.

The rules for the use of alcohol in typhus govern the practice recommended for the other continued fevers, with the addition as to relapsing fever, that the tendency to collapse at the period of crisis, especially in persons over forty-five, must be carefully counteracted; and as to enteric fever, that "stimulants are oftener called for in patients under twenty years of age, but a

smaller quantity usually suffices in patients more advanced in life." But those remarks are examples of very important practical statements which in a monograph are apt to look like hints of no great moment, and not to attract attention. We should have added, with reference to enteric fever, that, while in typhus, the necessity for stimulants invariably decreases, and never begins with defervescence, in enteric fever it frequently increases, and even begins in that stage of the fever.

Dr Budd's excellent book on Typhoid Fever, in conjunction with Murchison, inevitably raises the question of etiology. We regret to see that the latter has entirely gone over to the spontaneous generation of continued fevers. No fairer or abler advocates of their respective opinions than Murchison and Budd could be got. The former is more dispassionate and judicial than the latter. We do not find such unparliamentary phrases as occur in paragraph 3 at page 27 of Budd's book. A little less diffuseness and repetition—more, in fact, of that which only leisure and re-writing of papers published at long intervals will produce,—would add greatly to the convincing force of the work on Typhoid Fever. As it is, to one who will arrange in logical array all the facts within its pages, we think they will carry the conviction, not only that Budd's views are true on their own merits, but that they exhibit in etiology a method of observation and reasoning more in harmony with those followed in other branches of natural history, leading to results more consistent with the present position of biological inquiry. One cannot help feeling, in reading the etiological disquisitions of Murchison, as if they concerned a field which is isolated from, and not even conterminous with biology, while in fact it is a small portion of that wide area.

The broadest and ultimate aspect of the question of the propagation of communicable disease is, that which is taken from a consideration of the nature of contagia. It is now generally admitted, both from direct observations on such contagia as are accessible, and from the common phenomena of their propagation, that the active infecting material is solid and organic. It either is an independent organism or is derived from a higher organism. The particles are supposed by some to be fungoid, by others to be bacteroid, by others to be fragments of protoplasm, that neutral substance which is equally inclined towards animal and vegetable development. Dr Murchison declares on the whole for this latter view, of which Beale is the advocate; but whatever theory we adopt, the question of the origin *de novo* of infectious disease becomes simply a branch of that larger question of spontaneous generation. Having said this, we need not add that dogmatism either on the

one side or the other is impossible, although if we estimate the tendency of recent research aright, it is to a negative reply to this larger question. So far, therefore, the presumption is against the origin *de novo* in any case of the contagia. Dr Murchison's remark that "the poisons of all diseases must have originated at one time or another independently of a pre-existing case," and therefore why not now, is so obvious that if it were of the slightest use as an argument, it would be oftener made. We need only apply it to any individual instance, say to the case of syphilis, to show where it will lead us.

Dr Murchison alludes frequently to the nature of the task which he sets for himself, and the difficulties which beset it, and seems to feel rather keenly that after all he may be reminded that it is "impossible to prove a negative." Thus in reference to enteric fever, on the etiology of which he has expended all the resources of his accomplished intellect, he says (p. 484): "At the outset it must be conceded that where enteric fever is due to excremental poisoning of air or water, it is often extremely difficult, if not impossible, to exclude from the excrement the possible presence of typhoid stools. *I am fully alive to the apparently crushing nature of the argument that it is 'impossible to prove a negative' as well as to the facility of using it.*" This last adroit hit is perfectly fair when this argument is made the retreat of cowardice or of weakness. But, to use the argument without considering the value of it, is as unsatisfactory to a lover of truth, as it is for a lover of justice, when a criminal is acquitted on a point of form. There is no decision on the merits. Now, we submit that the difficulty of proving a negative is in exact proportion to the positive knowledge we possess concerning the nature and causation of the phenomena under inquiry; and, to take enteric fever as an illustration, it is only when we recall the accumulated facts as to its varieties of severity, from the "infantile remittent" of children, and the "typhoid febricula" of adults, to the most obvious and well-marked case; its omnipresence in geographical distribution; the consequent transport of its contagia as "guests" to all places accessible to human beings, and their subsequent paths of local distribution when cast out of the body, by air, water, water and air combined, articles of food (especially milk), and tainted clothing and bedding, sewer ramifications, &c., &c., that we can estimate, not "the *apparently* crushing nature of the argument," but its real, and, we do not hesitate to say, its insuperable force.

But Dr Murchison not only under-estimates the difficulty of proving a negative, he also under-estimates the difficulty of

explaining why his alleged positive causes exist without the effect which ought to follow being present. He begins with the disease, and endeavours to prove that a certain condition—overcrowding, excremental poisoning, famine, as the case may be—is the cause. We look around, and find everywhere the conditions existing without the disease. Take the case of excremental poisoning. Almost without exception, where outbreaks of cholera or of enteric fever have led to the analysis of wells and the discovery of impure water, this impurity has existed possibly for years before. The fever or cholera did not cause the impurity: they are not even coeval events. The supposed efficient cause exists for years, but no effect follows. Suddenly it comes with explosive force. What is the difference of circumstance that will account for this? The difficulty of this situation is evidently recognised by Dr Murchison, and he endeavours to overcome it by invoking the aid of various “factors,” whose concurrence is necessary; thus, “such a cause as decomposing sewage may exist long without any bad result, which at once ensues on the concurrence of another factor, in the shape of *some unusual state of the atmosphere*.” (p. 12.) “Excremental pollution may be *only one of several factors* necessary for the production of the poison, and in the absence of the other factors it may be inert” (p. 489). Again, we read, “It is probable that the stools of enteric fever are more prone than ordinary sewage to the *specific fermentation* by which the poison is produced, and that this explains why the disease is occasionally propagated by the sick.” This last seems an unfortunate phrase. The only specific element in fermentation is the *secundum quid*, which determines the character of the fermentation. Why not call it in this case the typhoid contagium? It seems to be necessary to go beyond the sphere of observation. Why not invoke the aid of specific germs, rather than that of such occult properties as “states of the atmosphere?”

Not only do we find everywhere the alleged causes of the specific disease present without the alleged effect, but we also find frequently an effect which is *not the alleged effect*. We find, for example, simple diarrhoea endemic in districts subjected to excremental poisoning. “Typhoid fever seems to be in its causes as in its nature, very intimately related to other diarrhoeal infections” (*Third Report of the Medical Officer of the Privy Council*, p. 3). “The ordinary autumnal increase, or circumscribed epidemics, of enteric fever, are usually preceded by a great prevalence of diarrhoea,” says Murchison (p. 495). These facts prove that excremental poisoning may have two distinct effects,—one which is simple and incommunicable, and one

which is specific and tends to propagate its like. The causes cannot be exactly alike when the effects are so different. What constitutes the difference?

Dr Budd records a crucial experiment made in "the Convent of the Good Shepherd, at Arno's Court, near Bristol," which to our mind fully answers the question. "In March, 1863, *diarrhœa* appeared in the reformatory, and in the course of two months more than fifty of the girls were under medical treatment for it. But, unless the ailments here named belong to the self-propagating class, up to the date of the events about to be recorded, no one of the *recognised* infections had ever attacked the inmates. For some months past the mortality had been low, and the health of the whole establishment exceptionally good. There had, at various times in the two preceding years, been some trouble with drains, but this had seemed to have passed away, and there were no bad smells about. In regard to the present history, it is specially important to note that at no time, whether the drains were at their best or their worst, had typhoid fever ever appeared within the walls. But the time had now come when this long-standing immunity was to be broken by a great tragedy. The magnitude of this tragedy may be estimated by the fact that, before it had come to a close, fifty-six persons had passed through the protracted miseries of this fever, and as many as eight had died of it. The origin of this terrible outbreak was to the last degree clear. The disease was introduced into the convent in the preceding November,* by a young girl who was admitted into the reformatory while actually labouring under it" (p. 129).

The peculiar value of this illustration, which as a scientific experiment, is as perfect as if it had been planned and carried out on purpose, consists in the long-continued fœcal poisoning, and the evidence of its access to the system afforded by the simple *diarrhœa*. Suddenly the specific germ of enteric fever is introduced, and forthwith an explosion of enteric fever follows. There are many striking instances of bad drainage, and consequent excremental pollution, not causing enteric until after the introduction of a person so affected into the locality, to be found in the Privy Council Reports, and in the pages of Budd. We would particularly refer to Ballard's "Report to the Local Government Board, on an outbreak of enteric fever at Nunney, Sept., 1872." It is epitomised by Parkes (*Hygiene*, p. 47), and it is important to note the effect of the narrative upon his unprejudiced judicial mind, as shown in this summing up: "The case seems quite clear,—first, that the water caused the disease;

* November, 1873, Dr Budd being sent for in February, 1874.

and secondly, that though polluted with excrement for years, no enteric fever appeared until an imported case introduced the virus. *Positive evidence of this kind seems conclusive*, and I think we may now safely believe that the presence of typhoid evacuations in the water is necessary. *Common faecal matter may produce diarrhoea, which may be febrile, but for the production of enteric fever the specific agent must be present.*"

Yet the only difference between such "positive evidence," and the negative evidence adduced by Murchison, is that we cannot detect the exact point at which the germ was introduced. A mere accident determines whether an outbreak of enteric fever will go to the positive or the negative side. If the very sick persons who carried the germs to Dr Budd's convent and to the village of Nunney had not been detected, we should, according to Murchison, have had to fall back upon "states of the atmosphere," "deficiency of ozone," or at best, "specific fermentation," for an explanation. After careful perusal of all the negative cases given in Murchison's book, beginning at p. 470, we think there is not one which might not by a fortunate accident have been transferred to the list of positive illustrations of various forms and paths of enteric infection; and an unlucky defect in the inductive evidence might similarly have deprived us of many of the positive cases. Moreover, a positive demonstration of a cause does not create the cause. How often must milk have conveyed the enteric germ before the fact was suspected, and finally proved? Every successive addition of this sort to our knowledge, makes the negative conclusions of previous observers still more worthless, besides, as already remarked, increasing the difficulties of "proving a negative," even for present observers.

We have just two remarks to make before leaving this subject. First, concerning the confusion of idea attached to the words contagion, infection, &c., when used in the discussion of what, when cleared of all theoretical conception, is a mere question of communicability or hereditary descent of disease. Each contagium has its own mode of entrance into, and mode of exit from the subject, and its own *habitat* or soil. Hence, such facts as this, that enteric fever does not spread in hospitals, while typhus and relapsing does; that typhus and relapsing fever in the houses of such persons as clergymen, doctors, &c., never spreads, while enteric fever will sometimes; that enteric fever extends in institutions among people who never see, much less touch, each other, must not be played off the one against the other. A fungus brought to daylight from a cellar will droop and die, but that does not prove that it cannot fructify

and spread. The remark seems obvious, but on reading discussions on etiology, we are often sensible of that obscurity of idea which arises from want of definition in the terms employed. It is only in this way that we can account for such a statement as this made by Harley in his paper on enteric fever, in *Reynold's System of Medicine*, "That form of enteric fever which prevails continuously in London is certainly non-contagious." The only ground given for such a statement is that he had "never had cause for the slightest suspicion of *contagion* in any case" which had come under his observation in various hospitals, which he names!

Our final remark is suggested by Dr Murchison's statement that the view which he has advocated for fifteen years as to the possibility of enteric fever having an independent origin, has been endorsed by "such authorities on fever as Griesinger, Niemeyer, Liebermeister, Hudson, and Stewart." To our mind, it by no means follows that because a man is an "authority on fever" his opinion on the etiology of fever possesses enhanced value. Taking the words in their usual acceptation, and the above cited names as examples of their meaning, we should pay much more respect to their opinion on points of diagnosis, treatment and pathology, than in a matter of etiology. In saying so we mean no disrespect either to our author or those who agree with him. They all approach the question as physicians. Their first point of contact with it is when a case, say of enteric fever, is before them. They inquire into the circumstances under which it has arisen, and they conclude that a certain one is the cause. The moment the cause of a disease has been discovered, prevention becomes a practical result. It is only in the endeavour to prevent those infectious diseases that we can test the intimacy of the nexus between an alleged cause and effect, especially where there is an attempt to prove a negative. In this view it is important to observe that Parkes, Simon, and the Privy Council staff do not admit the spontaneous generation of enteric fever. They all adhere to the necessity of the specific germ. They approach the question from the other end; rather they combine the information which is obtained from a general observation of unhealthy agents, with that which the circumstances surrounding actual disease afford. We venture to predict that the more public health becomes a special study, and the more it becomes habitual to observe the kind of relation subsisting between local conditions and liability to infectious diseases, the more universally will it

be admitted that the only refuge from confusion and dilemma is to be found in clinging to the continuous generation of communicable disease. In reference to such diseases a department of public health is the focus of information which more and more shakes our confidence in negative conclusions. The parable of the sower has its lessons for the student of etiology. The seed developed the different properties of the soil on which it fell. The "good ground" is to be found in many places where its goodness has not been elicited by the sowing of the seed; and as for the source of the seed, we have no difficulty. "In old communities," says Sir Thomas Watson "the *seminum* of each of these diseases is doubtless always dormant somewhere."

Before concluding, we wish to point out the great value of Dr Budd's book for those who are engaged in the prevention of disease. It is entirely a work for the medical officer of health, and any person who holds such an appointment should possess it. The author has an established reputation as an authority in the management of infectious diseases so as to limit their spread. We think that in regard to enteric fever it is unfortunate that he has complicated his argument with the opinion that the specific lesions are "a true exanthem of the bowel," an eruption similar to that of small-pox. Anatomically there is no parallelism between the pustules of small-pox and the glandular affection of enteric fever. The pustules of small-pox appear on the skin, and mucous membranes contiguous to the skin; but while the former does not affect by preference any of the anatomical elements of the skin, the latter invariably does select the glandular element of the mucous membrane of the lower bowel. Dr Budd is also at issue with Murchison and others in maintaining that the enteric stool is as poisonous in the fresh state as when decomposed. Any apparent increase of virulence after decomposition is explained by the diffusion of the pre-existing germs with the gases of decomposition. We think this a mere question of detail as regards the germ theory, but a more vital one in its bearing on Murchison's theory. It is by no means settled experimentally, and we commend the subject to the members of the Pathological and Clinical Society as a good one for further experiment.

VII.—THE PRINCIPLES AND PRACTICE OF SURGERY. By WILLIAM PIRRIE, F.R.S.E., *Professor of Surgery in the University of Aberdeen, &c., &c.* Third Edition. pp. 978. London: Churchill. 1873.

WHEN Aberdeen is mentioned, one is apt to think of grey granite and Findon haddocks; and, on the same principle, when Aberdeen surgery is the topic under discussion, one's mind naturally reverts to acupressure and stone in the bladder. And should any of our readers wish to peruse an excellent account of either of these subjects in a thoroughly condensed form, we recommend them to consult Professor Pirrie's book.

Acupressure was merely mentioned in his last edition. He wrote then: "Under the name of acupressure Dr Simpson has proposed a new plan of arresting hæmorrhage in surgical wounds and operations, by the employment of metallic pins or needles, instead of ligatures. . . . I shall take an early opportunity of making trial of this method, but cannot stop the press to give the result." In the present edition the subject is fully noticed, and, as all were prepared to expect, spoken of with confidence as "the best means yet devised for the arresting of surgical hæmorrhage." But there is one point in regard to which we remain, as most surgeons have been all along, unsatisfied, and it is all-important. Is it, or is it not the case, that we can leave a patient's bedside after the hæmorrhage from his wound has been staunched by acupressure needles, with as much confidence as after the vessels have been ligatured? Can, for instance, a country practitioner amputate a limb, acupress the arteries, and in a couple of hours afterwards return to his own residence, it may be, many miles away, with the same complete sense of security against bleeding, as he notoriously can do after the application of a sufficient number of ligatures? If this be not answered in the affirmative, the whole case for acupressure breaks down; and it is just at this point that the majority of surgeons appear to question its trustworthiness. Nowhere do we find a distinct reply to such a question in Dr Pirrie's account of the subject. He tell us—as a fact illustrative of the rapid and secure sealing of vessels by this means—"of a little boy whose thigh was amputated by the late Dr Keith, and who, four hours after operation, in the absence of the nurse, took out the pin which compressed the femoral artery without any bad result." Now, this is very interesting, but it cuts two ways. Most surgeons would dislike the idea of adopting means of restraining hæmorrhage, which curious or forward little boys may remove whenever they choose. Apart from any intentional removal, it

has always appeared to us that disturbance of the needles must be apt to occur in restless patients, such as we all occasionally meet with. But even admitting that they retain their original position, can they be thoroughly depended upon? No answer is given to this; nothing said of the occurrence of hæmorrhage before, upon, or subsequent to, their removal. We are told that "in almost every variety of operation, age, and sex," our author has "invariably employed acupressure, and never in a single instance failed in arresting the hæmorrhage." We are not at all surprised at it; but we should like to know whether this arrestment of the hæmorrhage has invariably continued permanent. Leaving out of question the opening up of stumps on account of hæmorrhage from vessels which escaped observation at the time of operation, but which have bled after re-action, and also those cases in which secondary hæmorrhage has occurred from the ulceration and sloughing of the vessel (because we may have examples of each of them equally when the ordinary form of ligatures is used) we should like to know whether or not Professor Pirrie has had to open up stumps on account of hæmorrhage from acupressure needles having slipped, or having proved inefficient, although remaining *in situ*. No vessel ever bleeds under like circumstances, after being properly ligatured. The advantages possessed over the ligature are given us in a table compiled by Sir James Simpson. But here again we look in vain for a solution of our difficulty. He refers only to hæmorrhage from ulceration, and his statement even in regard to this, is not altogether re-assuring. Under the column "Ligature," we find the following:—"Is sometimes followed by secondary hæmorrhage as an effect of sloughing and ulceration." Under the column "Acupressure" we find the following:—"Is seldom followed by secondary hæmorrhage from sloughing or ulceration, as it produces none." Such a comparison of the two is unsatisfactory; for "sometimes" and "seldom" are by no means opposite terms. Had Sir James been able to use "sometimes" and "never," or "often" and "seldom," the case would have been different. The ligature may be *sometimes*, and yet *seldom*, followed by secondary hæmorrhage, which is really the case; and he can say no more for the acupressure needle. Dr Pirrie makes no mention of ligatures which may be cut off short and absorbed without giving any trouble.

In spite of thus frankly expressing our doubts of the entire trustworthiness of acupressure, we must confess that our author has fully established here and elsewhere the fact that in his hands the treatment has been fruitful of most excellent results; and his clear description of the different methods of acupressure

ought to go far to enable others, who are desirous of trying the method, to meet with a like success.

The present edition of this work is considerably enlarged. The chapter on inflammation has been, apparently, almost entirely re-written with the assistance of the author's son. The subject is brought up to date, and Cohnheim and wandering white corpuscles get their fair share of attention. A chapter on dental surgery has been added, and that on ophthalmic surgery omitted,—an alteration which it is questionable if we can call an improvement. The work is now profusely illustrated, and exhibits, in our opinion, all the faults as well as the merits of illustrated text-books generally. Many of the pictures teach nothing, and may well be omitted. On p. 104 there is a wood engraving of a carbuncle on the back. No human being could guess what is intended to be represented. Many of the drawings are, however, excellent. It appears now to be very fashionable—and our author goes in largely with the fashion—to deal in double pictures, entitled respectively, “Before Operation” and “After Operation.” In the former there is generally depicted some horrible deformity of the face; in the latter a comely countenance, with the most insignificant of scars. This reminds us too much of certain railway station pictures in regard to food for cattle, and complete sets of teeth, although we well know the ends sought in the one case are very different from those of the other.

Bigelow's book on the hip has supplied here (as in new editions of other surgical works lately published), many fresh illustrations bearing on dislocations of that joint; but we still find the usual worthy-looking young men with dislocated shoulders having them reduced in various ways by the usual old gentlemen in dress coats and high collars. How long are they to maintain their position in our text-books? We are tired of them.

We heartily commend to students and practioners this much improved edition of an excellent and tried surgical text-book; and they will find that not the least of its merits are conciseness and good arrangement.

NOTICES OF BOOKS.

(1.) DR DAY'S essays on diseases of children have already either appeared in some of the medical periodicals, or have been read before one of the London Societies. They are not by any means deficient as essays on the subjects of which they treat, or for the purposes for which they were originally prepared, but they do not seem to us to stand the test of reproduction in a separate volume.

The two chapters on headaches constitute perhaps the most valuable part of this little volume, and they may be consulted with advantage by those interested in the varying significance of this symptom in the young.

The remarks on treatment throughout these essays are on the whole such as meet our approval, both as regards dietetic and hygienic measures, and the giving of medicines, and the abstaining from doing so. Our only regret is that in contributing another book to this branch of medicine, our author has not succeeded in giving us one of a more compact nature, and of more enduring interest.

(2.) DR BRAIDWOOD'S book is designed to supply some general information as to the management of children, from their first bath onwards during the period of infancy. We are somewhat surprised that the author gives his assent to the time-honoured custom of feeding children on sugar and water during the first twenty-four hours of their existence. The remarks on suckling and feeding are throughout sensible and useful. We are glad to see that Dr Braidwood's experience has led him to the opinion "that in Great Britain, at least, the practices of 'wet nursing' and of 'feeding with the bottle,' are not nearly so prevalent as formerly;" but we fancy this is not the experience of the profession here. The constant presence of the feeding bottle in the infant's cot, the use of perambulators for infants, and the administration of opiates by mothers or nurses, all come in for well-merited condemnation. Altogether, we can re-

(1.) *ESSAYS ON DISEASES OF CHILDREN.* By WILLIAM HENRY DAY, M.D., Physician to the Samaritan Free Hospital for Women and Children. London: J. & A. Churchill. 1873.

(2.) *THE DOMESTIC MANAGEMENT OF CHILDREN.* By P. M. BRAIDWOOD, M.D., Birkenhead. Smith, Elder & Co. London. 1874.

commend this pamphlet as likely to be useful to some of the inexperienced persons who have charge of infants. There is, however, a certain meagreness in the details of infantile management, which contrasts strangely with the discussion in the first chapter of such points as the treatment of infantile jaundice, umbilical hæmorrhage, ophthalmia, &c.; and we would suggest that in any future edition the space devoted to such things should be economised, so as to add to the fulness of the more generally applicable information.

(3.) MR HOGG's little *brochure* is a reprint of some of the author's former papers, and deals with two most important and much debated questions,—the parasitic origin of skin diseases, and the germ theory of cholera. On the former point the author, although he admits the existence of fungi in skin affections, inclines to the belief that the parasitic fungi are the result and not the cause of the disease. In this he follows Fox, Wilson, and Bennett of Edinburgh. Adopting the classification of Wilson, he describes the various cutaneous affections with some detail, and in support of his views, gives a series of microscopical results obtained from the examination of many cases. We are glad to see that he decries the too minute subdivision of some recent dermatologists, and the tendency to make skin diseases a speciality.

He is quite opposed to the germ theory of cholera, and thinks that it, like all other diseases, is simply a disturbance of the constructive and assimilative processes, whereby the normal integrity of the animal body is maintained. His history of the germ theory is clear and interesting, and indeed the whole work is worthy of a perusal.

(4.) THIS book, on the "Internal Parasites of Domestic Animals," has been written chiefly for members of the veterinary profession, agriculturists, and others interested in the rearing of stock, but it will be found deeply interesting by members of the medical profession as well. Its contents originally appeared as separate papers in the columns of *The Field*, and

(3.) SKIN DISEASES: AN INQUIRY INTO THEIR PARASITIC ORIGIN, AND CONNECTION WITH EYE AFFECTIONS; also the FUNGOID OR GERM THEORY OF CHOLERA. By JABEZ HOGG, Surgeon to the Royal Westminster Ophthalmic Hospital; Consulting Surgeon to the Hospital for Diseases of Women and Children, Vincent Street, London, &c.

(4.) THE INTERNAL PARASITES OF OUR DOMESTICATED ANIMALS. By T. SPENCER COBBOLD, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College, and Lecturer on Parasites and Parasitic Diseases at the Middlesex Hospital. pp. 144.

the style is therefore somewhat popular, but the name of the author is a sufficient guarantee for accuracy and trustworthiness. Leaving out many dry details of anatomical structure, the book is full of the most practical directions for the treatment of the "hosts," and for the diagnosis and removal of the obnoxious "guests." The sources of infection, both in the case of animals and of man, are fully pointed out, and the appearances of "measly" beef and pork clearly described. These descriptions will be found of especial use by sanitary officers and meat inspectors, the latter of whom, in Dr. Cobbold's experience, are too often totally ignorant of that technical knowledge necessary for the due discharge of their functions. To correct this state of matters is one of the aims of the book, but we are afraid that its mission will hardly be successful, so long as policemen and butchers are the chief meat inspectors in some of our large towns.

Another subject touched upon by Dr Cobbold is the possibility of infection arising from the "distribution of sewage or water containing fresh fecal matter," and though his illustrations of this question are taken from the accounts of Indian medical officers, yet it is evidently a matter of the gravest consequence for us at home, to inquire whether sewage farms may not be centres of infection, where parasitic ova may be localised, and produce measles in the cattle reared on such farms. *Ex uno disce omnes.* The book is full of these practical hints and suggestions. We therefore strongly recommend it to all concerned in the health of the community, and hope that it will have a wide circulation, and that its contents will receive that attention which their importance deserves.

Exchange Journals.

By Dr JOSEPH COATS, *Lecturer on Pathology in Glasgow University, and
Pathologist to Glasgow Royal Infirmary.*

STRICKER'S MEDIZINISCHE JAHRBÜCHER.

1873, No. II.

CONTENTS.—I. Investigations on the mucous membrane of the uterus, by Dr H. Kundrat and G. J. Engelmann. II. On the retrograde and new formation of blood-vessels in bone and cartilage, by J. C. Heitzmann. III. Embolism of the central retinal artery, by L. Mauthner. IV. Contributions on permanent extension, and the treatment of riding of the fragments in fracture of the bones of the extremities, by Dr Hofmök. V. A case of Melanæmia, by Dr S. von Basch. VI. Experimental Investigations on the Secretion of Bile, by Dr A. Röhrig. VII. On Scapular Crepitation, by Dr E. Galvagni.

VOL. VI., No. 2.—NEW SERIES.

I. The Mucous Membrane of the Uterus (*Kundrat and Engelmann*).—This is a somewhat elaborate paper, in which is discussed chiefly the condition of the glands of the uterine mucous membrane, and the alterations they undergo in menstruation and pregnancy. The relations of these glands to the formation of the decidua, and their renewal after delivery, are especially discussed; but it would lead us too far to attempt an abstract of the conclusions arrived at.

III. Transitory Embolism of the Central Artery of the Retina (*Mauthner*).—The author first refers to a number of cases in which sudden blindness has occurred, but after a time has been as suddenly recovered from. Sometimes these cases ultimately result in permanent and total blindness. The suddenness of the blindness certainly suggests embolism; but it seems difficult under this view to account for the perfect and sudden recovery. The author had the good fortune to examine a case during the period of blindness. A man suddenly had partial loss of vision, which soon became complete. On ophthalmoscopic examination there was perfect anæmia of the retinal arteries, evidently the result of embolism. But in a few minutes the blindness disappeared, and the vessels were found to have returned to the normal condition. This result was evidently not due to the embolus which had obstructed the vessel breaking up, and its fragments being carried into the branches of the artery, because such a condition would be readily enough detected. A very probable explanation is suggested by the author. He reminds us that the central artery of the retina is a branch of the ophthalmic, and that probably in these cases the embolism has stuck just at the off-giving of the branch, this being in accordance with the general fact that emboli usually stick fast at the point of bifurcation of an artery. In such case the obstructing shred would project in part into the ophthalmic and in part into the central artery, obstructing the latter, but probably only partially filling the former. Now the current of blood in the ophthalmic might readily enough wash away the embolus, and the portion of it in the central artery might be drawn out and carried off. The ophthalmic artery is distributed to the skin, and a small embolus in it which would not produce very distinct symptoms.

V. A Case of Melanæmia (*Busch*).—This condition, as is well known, is an occasional result of intermittent fever, and is characterised by the presence in the blood of free pigment in the form of granules and flakes. In the case recorded in the present paper the patient was the subject of prolonged intermittent, and complained latterly of pain in the urethra. The pain existed only during certain periods of the day and when urine was passed. The patient was in a cachectic condition. Examination of the urine showed the presence of phosphate of lime crystals, and pretty abundant flakes and cells containing pigment. The blood was now found to contain similar pigment, and the case was thus one of Melanæmia in which the pigment had got into the urine. This case differs from other recorded cases in which the pigment was found in the urine, in respect that throughout there was no trace of albumen present. The patient (who was a medical man) improved very markedly under the use of quinine and carbonic acid baths, but in spite of the restoration of the general health the pigment remained in the blood and urine as abundantly as ever.

VI. Action of Drugs on Secretion of Bile (*Röhrig*).—In this paper a series of experiments made on dogs and rabbits is detailed. The author found that for the secretion of bile a supply of blood by the portal vein is chiefly requisite, but that after ligature of this vessel the secretion is con-

tinued for a time by means of the blood of the hepatic artery. He could not be certain that simple irritation of the mucous membrane of the intestine produced any increase of the bile secreted. On the other hand, purgatives generally increase the quantity secreted, and are, therefore, cholagogues. Of the purgatives used the following is their order in power of increasing the secretion:—Croton oil, colocynth, jalap, aloes, rhubarb, senna, bitter salts, calomel, castor oil. It seems likely that these agents increase the secretion by a direct action on the liver after absorption, although they produce in the intestines a distinct hyperæmia. Injections of infusion of senna and rhubarb into the blood produced increased flow of bile, and that immediately after the injection. At the same time, the power which these agents have of producing congestion of the intestine, and thus increasing the supply of portal blood to the liver, no doubt plays an important part in producing the increased secretion. Acetate of lead and carbonate of soda both decrease the quantity of bile. It was noted that carbonate of soda caused anæmia of the intestines when introduced into them; and it is well known that acetate of lead contracts the general arteries of the body, so that the decreased flow of bile was probably due to decreased blood supply to the liver. Opium seems to increase the quantity of bile, apparently by paralysing the blood-vessels, and so increasing the blood supply. It is an anti-diarrhœic, by interfering with the ordinary peristaltic action of the intestines. It is worthy of note that this author confirms an observation already made by Schmulewitsch, that the liver removed from a living animal continues to secrete bile if warm defibrinated blood is passed through its vessels.

VII. Scapular Crepitus (*Galvagni*).—By this term is meant a grating sound produced in certain cases in the scapular region by movement, and which is audible often at a considerable distance. It can also be felt as a fremitus when the hand is placed over the scapula. The author endeavours to explain it by supposing the scapula in these cases to rub against the ribs, the bone in both localities being exposed by atrophy of the muscles. In a post-mortem on one case there was such exposure, and the explanation holds good at least here.

PART III. 1873.

CONTENTS.—I. Contribution on cancer of muscle, by C. Weil (with a Plate.) II. Investigations on putrid infection, by Dr G. Clementi and G. Thin. III. Studies on the surgical pathology of the organs of locomotion, by Dr E. Albert (Two Plates and two wood-cuts.) IV. The infective products of acute inflammation, by Dr J. Burdon Sanderson. V. Investigations on the structure of tendons, by A. Spina (with a Plate.)

II. Experiments on Putrid Infection (*Clementi and Thin*).—The experiments detailed in this paper were made with the view in the first instance of testing a statement of Davaine, to the effect that the poisonous action of putrid material is very much increased by its passage through the system of a living animal. That is to say, when an animal has been inoculated by blood which has become putrid in the usual way, it becomes the subject of symptoms which are usually fatal in a few days; but the blood of this animal inoculated on a previously healthy one, has a much more intense action, and the intensity increases by continuous inoculation through successive generations. The present authors by their experiments establish the general statement that the mortality of animals inoculated by blood from an animal which had been previously inoculated with putrid blood, is much

greater than among those simply inoculated with putrid blood. Of the former kind of blood—which for convenience is called transit-blood (*Durchgangsblut*) a dose of one decimilligram was sufficient, in most cases, to kill a rabbit. Of 23 animals which received from 0.08 to 0.00008 gram of this transit blood, not one survived, and only one lived as long as ten days, one six days, and four five days after the inoculation. In some of these experiments blood of the eleventh and twelfth generation was used, so that there must have been an immense increase of the infective material within the bodies of the animals. The nature of this infective material or contagium is not in this paper discussed, but it seems that its power is not destroyed by boiling, although it is by maceration in alcohol. It is also worthy of note that the inoculation of the transit-blood produced an infiltration of the skin and tissues at the place of injection, whereas with ordinary putrid blood this effect did not appear.

PART IV., 1873.

CONTENTS.—I. Investigation on the nerves of the capsule of the knee joint in rabbits, by Dr C. Nicoladoni (one plate). II. Contributions on the structure and function of the bladder and urethra, by Dr G. Jurié. III. On the inflammatory changes of the ganglion cells of the sympathetic system, by A. R. Robinson, New York (one plate). IV. On retention cysts of the female urethra in new-born children, and their relation to the development of the carunculæ, by Dr Jos. Englisch (three plates). V. On quarantine in cholera, by Dr Oser. VI. Public letter to Prof. Axel Key in Stockholm, by Prof. S. Stricker.

II. **The Muscular Layers of the Bladder and Urethra** (*Jurié*).—In this paper the arrangement of the muscular layers of the bladder and their relation to the internal sphincter urethræ are described. The external layer is the strongest, and it passes longitudinally from above downwards, being especially developed on the anterior and posterior surfaces. The middle layer is transverse but slightly oblique, the posterior bundles passing downwards and forwards and the anterior downwards and backwards, so that they cross somewhat. The internal layer is longitudinal but not very powerful. It is most developed at the upper end of the bladder, disappearing altogether at the level of the entrance of the ureters. The powerful external longitudinal layer is in part inserted at its lower extremity into the internal sphincter, so that when it comes into action it will draw asunder the sphincter and open the orifice. This sphincter is thus relaxed, not by the pressure of the fluid but by the direct action of the longitudinal muscular layer. A further point is that the entrance of the ureters was shown to be valved not only by the oblique passage through the mucous membrane, but also by the passage through the muscular coat. When the mucous membrane was cut away, and pressure exercised on fluid in the bladder, there was no escape through the ureters. It would thus seem that the contraction of the muscular coat of the bladder has a direct influence in closing the ureters and preventing regurgitation during the emptying of the bladder.

IV. **Retention Cysts of the Female Urethra** (*Englisch*).—According to this author, there are in the inferior wall of the female urethra and in the neighbourhood of the external orifice, glands which, under certain circumstances, form cysts by the retention of their secretion after obstruction of their ducts, in the usual way of retention cysts. These cysts may produce obstruction to the passage of urine. In connection with these

glands, there are often papillæ which sometimes enlarge. The so-called carunculæ of the urethra are just such enlarged papillæ.

V. Quarantine in Cholera (Oser).—This paper is a report drawn up to be presented to the third international medical congress, and it discusses the mode of spread of cholera, the utility of quarantine, and various other matters. From the consideration of the various epidemics, it is laid down as an established fact, that out of India, cholera always spreads by means of trade communication. And if trade is always a necessary condition, then theoretically quarantine ought to hinder its spread. But though this is no doubt true in theory, yet there are serious practical difficulties in the way of a strict quarantine, which apply especially to countries whose frontiers are mostly land. Islands which have little trade may by a strict quarantine manage to escape cholera. The various circumstances which seem to render quarantine of comparatively small utility as at present carried out are here discussed, and it may be well briefly to notice them. In the first place perfect closure of ports seems almost impossible. Then the duration of the quarantine is limited; there is generally a detention of 10 days, or at most of 15. And though the incubation of cholera is usually short, only 1 to 5 days, yet there are cases recorded where it was prolonged to 21 and even 28 days. Further, the proof of the actual existence of an epidemic is often difficult, and though cases have actually occurred, yet these being concealed or unknown, a vessel may get away from an already infected port with a clean bill of health. There is also always a certain danger that persons interested may conceal matters of fact, or directly tell untruth, and in the paper some cases of this kind are given. Then even though the quarantine has been very strict, yet a single case may escape, and this one case may give rise to as serious an epidemic as twenty. A case is mentioned in which one cholera patient led to an epidemic amounting to 2,000, among a population of 10,000, reduced to 6,000 by persons going off to the country. These difficulties in the way of a perfect quarantine should not in the opinion of the writer induce us to give it up entirely, should rather stimulate us to improvement. There is also great room for improvement in the hygiene of towns, and in the condition of the various means of transport. Ships, railway carriages, &c., are not at all so carefully looked after as they should be.

VI. Discussion on Inflammation of the Cornea (Stricker).—This paper is in the form of a letter to Axel Key in reference to a paper in Virchow's Archiv, on Inflammation of the Cornea (See this Journal, Feb. 1873, p. 271). This author opposed the views of Norris and Stricker (this Journal, Nov., 1870, pp. 83, 84) and the latter of these now criticises the statements of Key. This subject comes up again in our abstract of a paper in Virchow's Archiv. (See next page.)

VIRCHOW'S ARCHIV.

VOL. LVIII. PARTS III AND IV. NOVEMBER, 1873.

CONTENTS.—XX. Contribution to our knowledge of foot-halt in foals, by Professor Bollinger, Zurich. XXI. On epithelioma contagiosum in the domestic hen, and the so-called small-pox in birds, by the same (Plate IX.) XXII. Experimental investigations on the origin of the pus-corpuscles in traumatic keratitis, by Prof. A. Boettcher, Dorpat (Plates X. and XI.) XXIII. Experimental investigations on the functions of the brain, by Prof. H. Nothnagel, Freiburg (Plate XII., figs. 1-3.) XXIV. Investigations on

puerperal fever, by Dr Orth, Berlin (Plate XII., figs. 1-4.) XXV. On the origin of the sulphuric acid, and the behaviour of the taurin in the animal organism, Dr E. Salkowski, Berlin. XXVI. On the sacral tumour with foetal contents, by M. Freyer, Königsberg (Plate XIII.). XXVII. On embolic aneurisms, with remarks on acute aneurism of the heart (ulcer of heart), by Dr Ponfick, Berlin (Plate XIV. XXVIII.) On the persistence of the frontal suture, by Dr. T. Simon, Hamburg.

XX. The Pathology of Foot-halt in Foals (Bollinger).—This disease, which occurs in foals soon after birth, as well as in the young of other animals, is characterised chiefly by the lesions which we are accustomed to see in pyæmia, principally abscesses in the lungs, and pus in the joints. The present author thinks he has discovered the source of the pyæmic infection, or the primary disease, in an inflammation of the umbilical veins, this inflammation being, doubtless, connected with an unhealthy condition of the umbilicus after separation of the cord.

XXI. Contagious Epithelial growths in Fowls (Bollinger).—In this paper a description is given, with illustrative coloured plates, of a disease of fowls which seems to be eminently contagious. The disease is characterised by the formation of prominent epithelial growths on the head, especially those parts uncovered by feathers, similar eruptions occurring on the mucous membrane of the mouth and throat, as well as on the conjunctiva. The contagion of this affection seems to be an exceedingly tenacious one, as was proved by the following observation:—The disease had existed in an establishment for the breeding of fowls, and with a view to get quit of it, all the fowls were killed, and the house thoroughly disinfected, a considerable quantity of the utensils being burned. The place was left empty for six months, yet at the end of that time, when a brood of 24 was placed in it, the disease broke out in them, although they had been placed in a different part of the building. The disease which is here described has been formerly designated by many, small-pox of fowls, but it is certainly not this disease, as it presents quite other characters.

XXII. Source of Pus-corpuscles in inflamed Cornea (Boettcher).—This is another contribution to the interesting question of the source of the cells produced in inflammation, based as so many others have been on the investigation of the cornea. (See references at p. 261.) It will be remembered that as to the corpuscles which are so abundantly present in the inflamed cornea, one set of pathologists assert that they are chiefly derived from the blood-vessels outside the cornea, that they have migrated into the cornea; while another set say that they are derived from the cornea corpuscles, that they have originated within the cornea. Cohnheim led the discussion in the former view, and asserted that when the centre of the cornea is irritated by touching it with solid nitrate of silver, the signs of inflammation do not begin to show themselves first in the central irritated part, but at the margin; the centre, in fact, remains unaffected by the inflammation, while the peripheral parts have become crowded with pus-corpuscles, which latter produce to the naked eye the haziness present in keratitis. This fact, that when the centre of the cornea is irritated, the periphery first shows the signs of inflammation, Cohnheim takes as a strong evidence in favour of his position, that the pus-corpuscles come from outside the cornea. It is obvious, on the other hand, that if it were possible to produce a central inflammation of the cornea of the frog, without the periphery being involved, this would be a great blow to Cohnheim's view, and a strong confirmation of the other. The present author set about the attempt to pro-

duce such a central inflammation, and says he has succeeded. He states that the solid nitrate of silver is not a proper agent for producing an inflammation, because it kills the cornea corpuscles, and therefore prevents any action in them. He says that this is the reason why the inflammation is peripheral in these cases, the centre is practically killed and put out of action. He has, therefore, experimented with a variety of substances, with the view of irritating, short of killing the cells of the cornea. He uses chiefly chloride of zinc, in the solid or in solution, and by varying the length of application he gets different degrees of inflammation. He has also used a seton, inserting a fine human hair into the superficial layers of the frog's cornea, not passing it through the bulb, as this introduces sources of fallacy. He finds that it is quite possible to produce an inflammation of the centre of the cornea by these means, and this inflammation may be confined to the centre, no peripheral clouding being developed. The source of the pus-corpuscles in these cases was local and in great part the cornea corpuscles, which were always found altered within the inflamed area. These experiments, therefore, confirm the views of Stricker and others that the pus-corpuscles have a local origin.

XXIV. Presence of Micrococci in Puerperal Fever (Orth).—This paper gives the result of the investigation of a considerable number of cases of puerperal fever, with the view of determining the presence of low organisms in the inflammatory peritoneal fluid. He found always large quantities of micrococci, while cylindrical bacteria were nowhere present. When the fluid was injected into the abdomen of animals, and inflammation thus set up, he found in the exudation large quantities of similar organisms, so that there is evidently a large increase of them *in loco*. Inoculation of these fluids on the cornea of animals, according to the method of Eberth, showed that they germinated there, and produced the appearances described by that author. Inoculation from the cornea so affected to other corneæ was also successful.

XXVII. Embolism as a cause of Aneurism (Ponfick).—This is a somewhat prolix paper, and the author of it does not indicate in it the fact that the connection of aneurisms, especially of the brain, with embolism, has already been pointed out by several English observers. (See this Journal August, 1873, p 435.) Here we have, however, confirmatory evidence of these views, and the mode of formation of such aneurisms is investigated in a manner not hitherto attempted. During two years, the author has made a careful examination of the arteries of the body in all cases dying in the Charité at Berlin with endocarditis, and their number has not been inconsiderable. He has found aneurisms of smaller vessels in about one in ten or twelve cases, the aneurisms being chiefly of the brain and mesentery. In most of the cases there was calcareous degeneration of the vegetations of the inflamed valves. Bits of calcareous material were broken off, and sticking in arteries, partially obstructed them. By the repeated impulse of the blood, the calcareous plug is gradually forced through the wall of the vessel, and so by perforation a false aneurism is formed, whose sac is made up of the surrounding tissues. But he found that even a soft clot sticking in an artery may come to perforate its wall, and lead to an aneurism. In such cases the embolus has its seat behind a division of the artery, and the blood between the obstruction and the branch being, under these circumstances, exposed to greater pressure than usual, the embolus is pushed through the wall of the vessel. It is to be noted that this formation of aneurisms, as the result of embolus, only occurs in vessels which are surrounded by a soft parenchyma, the vessels of the brain and mesentery above all, and

no doubt the inconsiderable support furnished to the wall of the vessel by these tissues is an important determining condition. No aneurisms were found in these cases in the arteries of the kidney, for instance, where the tissue is firm. From the structure of these aneurisms, it is easy to understand how they so frequently rupture. They arise by perforation of the coats of the vessel, and their own wall is only formed from the surrounding tissue, which has no great consistence. Towards the conclusion of his paper, the author has some remarks on aneurism of the heart, or ulcer of the heart, and he points out that it arises where vegetations on the valves are large enough to touch the internal wall of the heart, and where at each closure of the valve they impinge against a certain point of such wall, and so come to erode it, and allow of the blood burrowing into the wall.

VOL. LIX. PART 1. DECEMBER, 1873.

CONTENTS.—On degeneration and regeneration of nerves, by Dr H. Eichhorst, Königsberg. (Plates I and II.) II. On a peculiarity of capillary blood, by Dr F. Falk, Berlin. III. On the influence of anæmia on the nutrition of the muscle of the heart, by Dr L. Perl, Berlin. IV. On paralysis of the vagus in man, by Dr P. Guttman, Berlin. V. Investigations on the physiological action of preparations of bromine, by Dr E. Stienauer, Berlin. VI. On the regulation of warmth, by Dr F. Riegel, Würzburg. VII. Smaller communications. 1. The bacteria question, by Dr M. Wolff, Berlin. 2. The bacteria question in acute yellow atrophy of the liver, by Dr Zander, Eschweiler. 3. Chronic pseudo-membranous peritonitis, after repeated paracentesis abdominis, by Dr C. Bäumler, Erlangen. 4. Report on the swine killed and examined for trichinæ, in Braunschweig, from Easter, 1872, to 1873, by Dr C. W. F. Uhde.

II. Non-coagulability of Capillary blood in Dead Body (Falk).—Virchow was one of the first to observe that the blood found in the capillaries after death does not coagulate, seems incapable of coagulation. In the present paper the author seeks to find the cause of this, his experiments being made on the blood of man and the horse. Schmidt has lately added a third substance to the two which he formerly supposed necessary to the formation of fibrine. It will be remembered that he named the two chemical substances analysed and separated by him, the fibrino-genetic and fibrino-plastic substances, but lately he has discovered and separated a ferment substance. Following the method of Schmidt the author has analysed and investigated capillary blood. He finds that there is no perceptible diminution of the fibrino-plastic substance (paraglobulin). The power of development of the fibrine-ferment is diminished in the capillary blood, but it is so in all the blood found in the dead body and not specially in this. The essential cause of the diminished coagulability is the decrease or absence of the fibrino-genetic substance.

III. Fatty Degeneration of Heart from Anæmia (Perl).—This is an experimental investigation into the question whether simple acute anæmia is capable of producing fatty degeneration of the heart. That in the human subject fatty degeneration has been frequently found associated with anæmia is asserted by many authors. In the present case experiments were made to produce a direct artificial anæmia in animals. The result is that when by successive blood-lettings, dogs are reduced to a state of fatal marasmus, there is then distinct fatty degeneration of the heart. But when the animals were subjected to frequent less extreme bleedings, this condi-

tion was not present. It is interesting to note the order in which the separate portions of the muscular system of the heart were affected in the case of large bleedings. The papillary muscles on the left side were most intensely degenerated, but those on the right nearly as highly. Then in descending scale are the walls of left ventricle, of left auricle, of right ventricle (almost as much as left auricle) and least of all the right auricle.

IV. Symptoms of Paralysis of Pneumogastric in Man (*Guttmann*).

—This author records a case of diphtheria, in which along with other nerves, he considers that the pulmonary and cardiac branches of the vagus were paralysed. There was the ordinary paralysis of the pillars of the fauces, along with the paralysis of the left sterno mastoid, and slightly of the legs. But in addition there was extreme dyspnoea, and slowness of the respiration, with marked increase of the pulse-rate, and these symptoms are just such as result from the division of the vagus of animals. The author considers that here the paralysis was central, and this conclusion is arrived at chiefly for two reasons, first, there is no apparent cause of peripheral paralysis, nothing pressing on or interfering with the nerve; and, secondly, there was no sign of paralysis of any branch of the vagus except the two named, no affection of the laryngeal, oesophageal or gastric. In the rest of the paper there is a collection of the recorded cases of paralysis of the vagus, whether depending upon central or peripheral causes.

VII. 2. **Bacteria in Acute Yellow Atrophy of Liver** (*Zanders*).—In a case of acute yellow atrophy this author found numerous bacteria along with the usual debris of the hepatic cells in the liver. This confirms a similar observation previously made by Waldeyer.

VII. 3. **Chronic Pseudo-membranous Peritonitis** (*Bäumler*).—This form of peritonitis has been found in cases of repeated paracentesis in valvular disease of the heart (see this Journal, Jan. 1874, p. 131). In the present case there was Bright's disease, with great ascitic accumulation, and in it too, repeated paracentesis was followed by this form of affection. Here, however, there does not seem to have been such extreme vascularisation and hemorrhage as in these other cases.

REICHERT AND DU BOIS-REYMOND'S ARCHIV.

1873. No. I.

CONTENTS.—I. On the amount of carbonic acid in the urine in fever, by Dr C. A. Ewald, Berlin. II. On certain muscles and fasciæ surrounding the urethra, by Dr P. Lesshaft, St Petersburg (Plate I.) III. Contribution to the physiology of the torpedo, by Dr F. Boll, Berlin. IV. On reflex innervation of the blood vessels, by Dr E. Pick, Stettin. V. On the *Phoca baicalensis*, by Dr B. Dybowski (Plates II. and III. A.) VI. Variety of the interosseus dorsalis muscle of the hand, by Dr A. v. Brunn, Göttingen (Plate III. B.) VII. Description of an early human foetus, in the vesicular stage of development, along with comparative investigations, on the vesicular foetuses of mammalia and man, by C. B. Reichert.

III. **The Physiology of the Torpedo** (*Boll*).—The author used the opportunity which presented itself to him, during a stay at a watering place in Italy, to make a series of vivisections of the torpedo, the species used being the torpedo narke Aristot. His first object was to test the statement that irritation of the nerve which passes to the electric organ, produces a shock

sufficient to cause contraction of the muscles in a living animal, a nerve of which is brought into connection with the electric organ. For this purpose the sciatic nerve of the frog was connected with the electric organ by means of tin-foil, and the shocks were quite sufficient to produce contraction of the muscles of the leg. In a similar manner he showed that the animal's own nerves, and even its central nervous system could be irritated by shocks from its own electric organ. Even the electric nerve of the other side, and its central ganglia could be thus irritated, and shocks produced by shocks. A comparison of the nerves of the frog and the torpedo in these respects seems to shew that those of the latter are less irritable than the former. Another interesting fact was sought to be explained by experiments, and that is how, when the animal discharges its electric organ, its own nerves are not irritated, and its own muscles not violently contracted. It has been shown already that they are irritable to the shock, how is it that they are not irritated? One theory suggested is, that at the moment of the discharge of the electric organ there is a counteracting impulse from the central nervous system, which checks the contraction of the muscles. In order to test this, the author endeavoured to separate a portion of the body from the central nervous system, by cutting a nerve stem, or the spinal cord at a certain level, so as to see whether such a portion of the body would show muscular contraction. His results are not quite unequivocal, but when the dissection was made with the greatest precautions, the muscles did contract in the affected part of the body on discharge of the electric organ. A number of experiments made with poisons are very interesting, although principally confirmatory of previous observations. Strychnine increases in the most marked manner the reflex irritability of the animal. Morphia does not do so. He also notices the apparently wonderful immunity which the animal as a whole, and its electric organ, possesses against curare. He injected two to three Cc. (30 to 40 minims) of a one per cent. solution of curare, without any apparent effect. The animal swam off as usual. The finer structure of the electric organ is only sketched here. He reserves for a more detailed paper its more minute description.

No. II. 1873.

CONTENTS.—I. C. A. v. Wistinghausen's endosmotic experiments on the participation of bile in the absorption of neutral fats, brought forward by J. Steiner, Berlin. II. On the hæmatogenous formation of bile colouring matter, by J. Steiner. III. On a remarkable abnormality of the upper jaw, by Dr W. Gruber (Plate IV.) IV. On the temporo-maxillary arch placed on the temporal surface of the zygoma—arcus maxillo-temporalis intra-jugalis—in man (an animal formation); with addenda on the divided zygoma—os zygomaticum bipartitum—without or with the temporo-maxillary arch, by the same (Plate V). V. On the cataphoric changes of the moist porous bodies, by H. Munk. (Plate VI.) *Continued in next part.*

I. This is the translation of a well-known but rather scarce inaugural dissertation, published in Latin in 1851. The experiments relate to the question how bile facilitates the passage of neutral fats in the alimentary canal into the radicals of the chyle-vessels.

II. The direct transformation of blood into bile pigment (*Steiner*).—It was long a matter of discussion whether the colouring matter of the bile was conveyed to the liver as such, and only separated there, as the salts are by the urine, or whether it was actually formed in the liver. This question has been settled to the effect that the colouring matter is secreted or formed by the liver, from the blood colouring matter. But more recently the

question has been raised, whether there is any other possible source of the biliary pigment. Of late, two such sources have been asserted. Frerichs, going on the view that no biliary acids are to be found in the urine in icterus, came to the conclusion that these are convertible within the blood into the biliary colouring matter. But it has since been shown that biliary acids are to be found in the urine in icterus, and it is not proved that the colouring matter obtainable from the biliary acids is the same as the biliary colouring matter. So that this source of the bile pigment is exceedingly doubtful. It has been supposed that in disease involving a destruction of the red blood corpuscles there is sometimes a conversion of the blood colouring matter into the biliary. This is the so-called hæmatogenous icterus. The idea of such a source of bile pigment was originated by Virchow, who found in the kidneys of a fœtus some extravasation of blood, whose colouring matter had undergone changes which made it very like bile pigment. It was a natural supposition that such changes might even occur within the circulation, and result in a general staining of the tissues with the altered blood pigment. Then a variety of experiments were made, in order to produce, if possible, this hæmatogenous icterus in animals. In this view, various substances were introduced into the blood with the view of dissolving the red blood corpuscles, and setting their pigment free—water, chloroform, ether. Free blood pigment was also injected and alkaline biliary salts. The result of these experiments has been rather unsatisfactory, and the present author has formed the intention of repeating them. In the present paper the experiments with the injection of water are repeated, and the results are entirely negative. We shall look for the continuation of the paper with some interest.

TRANSACTIONS OF
The Medico-Chirurgical Society.

SESSION 1873-74.

FIFTH MEETING, Friday, 9th January, 1874.

Dr Strethill H. Wright, Barony Lunatic Asylum, was admitted a member.

Dr H. Cameron read

“A PLEA FOR LEGISLATION IN REGARD TO LOCK HOSPITALS.”

After stating that the mode of admission of patients into the Lock Hospital was either by direct personal application or through the Parochial Boards who subscribed to the institution, Dr Cameron described his experience of the working of the present system, judged by its results. There was no power of retention until a cure was effected. A woman applied for admission, impelled by her bodily sufferings and crippled for the pursuit of her trade. After a week's rest and regular living she began to feel lively, and to find the restraint irksome, the specific lesion being as dangerous to the public as ever, indeed more so, because she could now endure prostitution.

She demanded dismissal and must obtain it. In some of its arrangements, a Lock Hospital resembled a jail, which made it irksome. A system of signed promise to remain sufficiently long in hospital had been tried, but was found practically worthless. A power of compulsory detention was required. It might be said that none would enter the hospital on such conditions, but those who applied voluntarily really did so because they could not help it. If they went to the Poor House, they would be sent to the Lock Hospital. Another way of compelling sufficient residence would be by sending to the hospital, women who, on criminal conviction, were found to be suffering from venereal disease. The greater proportion of the patients belonged to the criminal class, and were frequently committed to jail. Dr Cameron believed that if, instead of passing a "Contagious Diseases (Women's) Act," Parliament had passed a measure for the "Compulsory Retention of Women in Lock Hospitals," or an Act under some such name, the popular opposition to the Contagious Diseases Act would have been entirely avoided and the results would have been much more universally beneficial than any obtained at present.

The President said that the paper was a very admirable and eloquent one on an important subject. The evils attending the existing system had been very vividly portrayed and the remedy indicated, though perhaps the method of applying the remedy had not been sufficiently explained.

Dr Hugh Thomson thought the remedy which Dr Cameron had suggested was the best one in the circumstances, and perhaps adequate to meet the evil. The objections so strongly urged against the compulsory inspection of this class of females were not valid when they voluntarily placed themselves under treatment, and the aid of the law was simply asked to enable the hospital authorities to make that treatment effective.

Dr Graham (Paisley), also approved of the suggestions in the paper.

Dr Perry said that, as a former medical officer of the Lock Hospital, he could not say that the evil to which Dr Cameron referred was so greatly felt in his time as it appeared to be at present. Some, no doubt, left the hospital at that period in opposition to the wishes of the medical attendants, but these were rather exceptional cases. Perhaps the measure suggested by Dr Cameron might be carried in Parliament much easier than the more stringent and peremptory bill which had been so much before the public of late years.

Dr Cowan had taken great interest in the paper. When a student he had been one of the very few who attended the Lock Hospital, and subsequently as a Director of the Institution he had become acquainted with the difficulties surrounding the subject spoken of by Dr Cameron. While he was not opposed to the principle of Dr Cameron's suggested measure, he had some doubts how it would work. He was afraid it would operate in preventing the women from entering the Hospital; and thus indirectly be the means, not of diminishing but of increasing the amount of disease. The Habitual Drunkards Bill was liable to a similar objection, with this difference, that the habitual drunkard was himself the principal sufferer from his vice, while, in the case under consideration, disease might be indefinitely spread among many through the operation of a law intended to check it. That a patient applying for admission to a Hospital should be compelled to surrender her freedom was a principle which the Legislature would be slow to sanction in these days. Dr C. then adverted to the action of the

police in putting down brothels in Glasgow, and said that from conversations on the subject with medical men and police officials he had reason to believe that the result had been to increase in a corresponding ratio private prostitution.

Mr John Reid saw little difficulty in dealing with the evil to which Dr Cameron alluded, in a way not involving legislative interference. Let every applicant for admission to one of these Hospitals distinctly understand that the necessary condition of admission was that she must remain until dismissed by the Hospital authorities. A bye-law of the Institution would, in fact, serve the purpose to accomplish which Dr Cameron would invoke the strong arm of the law. Mr Reid also bore testimony to the spread of private prostitution in late years in Glasgow.

Dr Morton enquired whether the Public Health Act contained any clause which would enable the Lock Hospital authorities to retain their patients till they were dismissed? The Public Health Act contained a clause by which persons labouring under small-pox, or other infectious disease, and who were likely to spread the disease, could be sent to Hospital. Why could this not be done with the "French pox"?

Dr John Coats said that the paper had brought forcibly to his mind the changes which had taken place in the Lock Hospital during the last thirty-five years. At the period he first knew it, there were two surgeons who did duty alternately every six months. There was at that time no trouble with the patients. The hospital was well managed, the patients classified, and kept in employment. There was a kind of rivalry between the surgeons as to which of them would cure the cases in the shortest time; but no desire was manifested by the patients to leave before they were dismissed.

Dr Lyon was of opinion that no woman should be admitted to the hospital unless under an engagement to remain in it until she was dismissed, and that this would meet Dr Cameron's difficulty.

Dr Howatt thought that an agreement or engagement on the part of this class of patients which could not be enforced by Act of Parliament would be valueless. He approved of Dr Cameron's suggestion.

Dr Cameron, in reply, said that his object in reading this paper had been to suggest a plan of meeting a clamant evil, which would not be liable to the objections so persistently urged against the Contagious Diseases Act. That some legislative enactment could be devised to accomplish some of the objects of these acts was surely not a Utopian idea, and his paper was intended as a contribution to the solution of the question by legislative provision. The management of the Lock Hospital was at present as strict as it was at the time to which Dr Perry referred; but the superintendent's power was limited, and he could not go further than the law permitted. The objection referred to by Dr Cowan, that his proposal would involve an infringement of the liberty of the subject, was mostly a sentimental one. It must be remembered that in the great majority of cases the trade of prostitution was deliberately chosen; and that a person suffering from a disease which might do irreparable injury to others, should, in applying to a hospital to be cured, be obliged to remain till the cure was effected, seems one of those violations of individual liberty which are called for by the public good. A mere promise would be perfectly useless, since, if there was one vice more characteristic than another of this class of unfortunates, it was *lying*.

SIXTH MEETING, 6th Feb., 1874.—Dr R. Scott Orr, President, in the chair.

Mr Robert McKechnie, and Dr J. Jack, both of Glasgow, were admitted ordinary Members.

Dr Gairdner read

"CASES OF EMBOLISM."

[These cases will be published in next number.]

The President thought the cases extremely interesting. He (Dr Orr) had some years ago published a report of two cases of embolism. [See this *Journal* for February, 1869.] What was the cause of the formation of these deposits in the heart? His own opinion was, that they were a result of diminished vitality, and languor of the circulation. This view was supported by the fact that these deposits were usually met with in those parts of the heart most removed from the great sanguineous wave.

Dr Hugh Thomson said that there was one question suggested to him by a perusal of the tables of temperatures which Dr Gairdner had shown in connection with one of his cases. The daily rises and falls of temperature appeared distinctly in some places to be connected with the embolic phenomena, but in other cases the connection was not so apparent. A glance at the tables would show that there was almost a daily paroxysm of fever, which appeared in fact to be a feature of this case. His question, then, was, how did Dr Gairdner account for this as a characteristic of embolism?

Dr Perry had seen a case in private practice, the symptoms of which indicated embolism in the brain and in the lungs. The patient, an elderly lady, had suffered long from a bronchial affection. On being called in to see her, he found her in a state of coma, and paralysed in the right side. She gradually rallied, and regained the use of her limbs, and, to a considerable extent, the power of speech. He was soon sent for again, however, and found that the whole of the left lung had become condensed. He came to the conclusion that there was embolism here. She lived for about a fortnight, when gangrene of the lung took place, with hæmoptysis.

Dr Joseph Coats said that what struck him as a pathologist was that embolism as a recognised clinical state was much less frequent than one would infer from the frequency of its appearance at *post mortem* examinations. His experience was that there were very few cases of valvular heart disease in which it was not possible to detect emboli. That a pathological phenomenon which was a matter of so frequent observation after death should so seldom manifest itself by unmistakable indications during life was to him very striking. Dr Gairdner spoke of vegetations of the valves as a cause of embolism, while Dr Orr referred to vegetations in other parts of the heart. His experience led him to believe that there were two distinct causes of the embolic condition. In cases of dilatation without valvular disease there were globular vegetations formed in the retired parts of the heart. These got broken up, and the debris was carried forward by the circulatory wave, and was often found in parts far removed from the heart. Another point of interest to him was the fact mentioned in connection with one of Dr Gairdner's cases, that blood and albumen were detected in the urine. It seemed remarkable that the plugging of an artery should produce this condition. How was the rupture of the blood-vessels effected? They would expect that the plugging of an artery would produce anæmia of the vessels, but here was an effect exactly of an opposite nature. The fact was that the escape of blood was accounted for by an intense congestion of the affected part. The area supplied by the plugged vessel almost always became highly congested—became, in fact, like a blood-clot, and there was rupture of the vessels. Some of the latest experiments on this subject, which, however, he had not yet fully investigated, were those by Cohnheim, who produced embolism artificially, and observed the effects on the transparent vessels. The phenomena observed were, congestion of the

part supplied by the obstructed artery, and ultimately, rupture of the over-filled vessels.

Dr Donaldson had a case in which embolism had followed a blow on the testicles. Unfortunately his diagnosis had not been verified by a *post mortem* examination. There were no symptoms indicative of diseased heart. The boy had chronic enlargement of the left testicle. This was followed by inflammation and sloughing. The left leg became cold and ultimately mortified, and immediately thereafter the brain became affected.

Dr Gairdner, in reply, said that the only question elicited by the discussion, to which it appeared necessary to give a reply, was that put by *Dr Thomson*. That question was—how did he account for a daily paroxysm of fever without any indications of new embolism? Now a little reflection would show that when emboli had been formed, or circumstances brought about their occurrence, it was to a great extent a matter of chance in what way the embolic phenomena presented themselves, depending chiefly on the size of the clot or the *debris*. There were fifty situations in the economy in which it might give rise to symptoms—not indeed always to symptoms, but to phenomena—often not easily accessible to observation. This argument became still stronger when it was stated that it was a far more probable thing that the clots should be washed away by a process of slow friction. The commoner form of embolism, therefore, was when the *debris* of the clots were washed away into the circulation, and struggled on until they were arrested in the capillary system. Capillary embolism must indeed be the ordinary form of that condition, though they had no very certain means of recognising it. *Dr Coats* had remarked that obstruction of an artery was generally followed by congestion. Now, let them consider this occurring in a thousand parts of the body, in places not like the kidney and other organs where such a plug would give evidence of its presence, though in the kidney itself two-thirds of the emboli which actually occurred would remain undetected, how natural and inevitable it was that there should be occurring constantly a train of febrile symptoms?

SEVENTH MEETING, 6th March, 1874.—*Dr Fergus*, Vice-President, in the chair.

Dr Cassells read a paper on

“PARAKENTESIS OF THE MEMBRANA TYMPANI—OBSERVATIONS HISTORICAL AND CLINICAL.”

See p. 198 of present number.

After several members had put questions to *Dr Cassells*, and had received further explanations of some points touched on in the paper,

Mr John Reid said that he desiderated in the paper the necessary points for diagnosing the classes of cases in which this operation would be suitable. The paper in other respects showed learning and a mastery of the subject. There was one thing in aural practice which occasionally gave him great concern, he alluded to the destruction of the membrana tympani after scarlatina. There was first inflammatory action, followed by suppuration, and then inevitably the destruction of the membrane. In those cases especially in which throat affections had supervened, did this happen. He had at present a case of this kind in a young man of twenty-one, in which the membrane had been destroyed by scarlatina. He suffered much from a fetid discharge. This was a type of cases very often met with, and he trusted that *Dr Cassells* would direct special attention to them.

Dr Morton said that the paper displayed much erudition. He asked *Dr Cassells* whether he had tried the operation in cases of gouty or rheumatic

disease, in which the hearing was impaired from a collection of thinnish fluid in the ear.

Dr George Buchanan had little experience in aural surgery. It appeared to him that the operation was a substitute for the method of opening the passage to the ear by the Eustachian tube, and was applicable in those cases in which the latter mode was not possible. It was something to know that a collection of fluid could by this operation be removed without much injury to the parts. *Dr Cassells* had defined the cases in which it was suitable as those in which there was inflammation of the tympanum with inspissated mucus. *Dr Buchanan* was glad at the very considerable progress made by aural surgery in recent years. The late Professor Syme began some remarks upon polypus of the ear, with the somewhat sarcastic observation that there were two classes of ear diseases—the curable and the incurable—the former were amenable to the ordinary modes of medical and surgical treatment, while the latter could be dealt with *by the aurists*. If this was ever true, it was at all events true no longer. *Dr Buchanan* then referred to some experiments he had made in 1859, which resulted in his having to some extent anticipated the discovery of *Politzer's* method of removing obstructions in the Eustachian tube, and to his having utilized the discovery shortly afterwards in completely curing a case of deafness.

Dr Cassells in reply, said that in regard to *Dr Morton's* question in reference to patients of a gouty or rheumatic diathesis, he had not himself seen a case of the kind described, and he believed that these cases were more prevalent on the Continent than in this country, where the operation of perforating the membrana tympani was a recognised means of treating them. With regard to *Dr Buchanan's* claim to a discovery of *Politzer's* method, he might mention that a great many had advanced a similar claim. In 1860 *Politzer* was working at Wurzburg, making the experiments on which was founded his method of treatment. *Dr Cassells* concluded by making some remarks on the *rationale* of the removal of obstructions by *Politzer's* method.

Glasgow Pathological and Clinical Society.*

FIRST SESSION, 1873-74.

OFFICE-BEARERS.

President—*Dr W. T. Gairdner* ; *Vice-President*—*Dr Joseph Coats* ;
Secretary—*Dr James Finlayson*.

FIRST MEETING, Nov. 25th, 1873.

Dr Reid shewed preparations, drawings, and sections of a MEDULLARY CANCER AT THE BASE OF THE SKULL, and gave the following clinical history :—

The patient, a man aged 40, was first seen in July, 1872, when he was suffering from paralysis of the right external rectus. This passed off to

* Instituted in November, 1873, on the basis of a working Society of limited numbers for the exhibition and study of patients, preparations, and other objects of clinical and pathological interest.

some degree, but in the following November he was suddenly seized with paralysis of all the muscles of both eyes, and upon further examination there was found to be impaired sense of smell, partial paralysis of face, hemicrania, and complete deafness, all on the right side; there was also some gastric irritation. These affections after a time passed away almost entirely, but when seen in April, 1873, there was again partial facial paralysis, and some affection of the muscles of deglutition, with dimness of vision in right. Vision rapidly became worse, and soon ended in complete blindness in that eye, and the left began also to fail. The ophthalmoscope showed small reddish patches on the optic disc, looking more like stains than extravasations, and being, moreover, unconnected with any blood vessel. Exophthalmos of both eyes now supervened, and that to so great a degree that the eyelids could not be closed; there was also passive congestion of the conjunctiva. The symptoms henceforth slowly increased in intensity; the hearing of left ear became less acute, there was partial paralysis of the left arm, accompanied by pain, which, however, was less marked when patient was seen two months later. In October the gastric derangement became more troublesome, the patient had constant fits of vomiting; diarrhoea succeeded, and the patient slowly sank, remaining conscious to the last.

At a *post mortem* examination made by *Dr Joseph Coats*, the middle fossa of the skull was found to be filled with a soft nodulated tumour, which reached laterally to the margin of the greater wing of the sphenoid, involving also the petrous portion of the right temporal. The body of the sphenoid and basilar process of the occipital were of a deep port-wine colour, and the clinoid processes were absorbed. The left cavernous sinus and extremity of the left petrous bone were also implicated. The optic commissure was unaffected, but the right optic nerve at its exit from the skull was covered by the tumour. Microscopic sections of the optic nerve entrance showed numerous amyloid bodies scattered through the nerve; but no hemorrhages or other abnormalities. The sections of the tumour and of the softened bone had the usual appearance of encephaloid cancer, viz., abundance of small round cells, with fibrous tissue, which, in the case of bone, more or less completely replaced the osseous tissue.

Dr Reid said, that the disease appeared to have originated in the body of the sphenoid, and probably at an early period extended to the terminations of the olfactory nerve, and the right auditory at its seat of distribution. The loss of sight and the paralytic symptoms were evidently due to the pressure on the nerves in their passage through the diseased structure, and this may account for the partial and transient character of the paralysis.

Dr Coats said, that he had examined sections of the tumour, and found cells of various shapes, but of small size, situated in a dense stroma. He considered that the tumour had originated in the cancelli of the bone. Some of the sections showed the cancelli occupied by the tissue of the tumour, and the bony lamellæ undergoing atrophy. It was further noticed how rapidly the bone disappeared before the tumour.

Dr Cameron showed—I. Three PROSTATIC CALCULI passed *per urethram*. They were all faceted, and of varied and very grotesque form. Externally they presented somewhat rough but glistening, varnished-looking surfaces. The patient exhibited symptoms of vesical irritation; and pressure on the

prostate with the fore-finger in the rectum produced a crunching sensation, resembling that caused by "marbles in a bag." The patient was afterwards operated on in the Infirmary, when between one and two hundred calculi were extracted from his prostate. II. A URINARY CALCULUS, about the size of a coffee bean, cut out of the urethra. It lay some little distance behind the point at which the skin of the penis becomes the skin of the scrotum. Forceps failed to extract it, and it could not be pushed either backwards or forwards. Under the circumstances, it was thought expedient to remove it in the following manner:—The scrotum being pushed back so as to displace the skin, the stone was cut out without wounding the scrotum. When the parts were replaced, the wound in the skin and that in the urethra were, of course, distant from one another; and the track of the wound was more or less valved. In view of the liability to urinary fistula, after wounds of the penile portion of the urethra, this plan of operating seems deserving of notice. It is essentially that recommended by Celsus, who pulled the skin of the penis forwards. III. A CALCULUS which blocked up the right ureter of a woman for six weeks, causing a hydro-nephrosis as large as a child's head. One day, when actively scrubbing a floor, she felt something suddenly give way in her side; then was seized with an uncontrollable desire to make water, which escaped involuntarily as she ran to a vessel, into which she passed a large quantity of urine, and the calculus exhibited. The abdominal muscles had "shampooed" the swelling; while, perhaps, the attitude of the woman at the time had something also to do with the happy result.

Dr John Wilson exhibited a section of the vertebral column of a boy who had been operated on antiseptically for SPINA BIFIDA. The case was fully reported in the *Glasgow Medical Journal*, of November, 1871. The specimen embraced the middle five dorsal vertebræ, and was longitudinally divided so as to expose the cord, numerous fibres of which were seen to pass backwards through a sheath of ligamentous tissue into the collapsed tumour. The two vertebræ, between which this bundle of fibres passed, were much more widely separated than the others, and their arches were as perfectly ossified as the others, thus leading to the surmise that this might not be so much a case of cleft spine from original deficiency in the arches, as of spinal hernia from the separation of the two vertebræ. A coloured chalk diagram was used, more fully to illustrate the section. In order to recall briefly the history of the case, it was mentioned that the boy, when a fortnight old, had a semitransparent tumour between the shoulders; that this being freely opened under an antiseptic veil, and dressed antiseptically, gradually collapsed, and ultimately became flat and shrivelled like a dried fig; that the child enjoyed good health until it was twenty months' old, when it was carried off by broncho-pneumonia.

SECOND MEETING, December 9th, 1873.

Dr Joseph Coats showed the preparation from a case of LYMPHO-SARCOMA

OF THE BRONCHIAL GLANDS, extending to the pericardium and heart on the one hand, and the lungs and the bronchial tubes on the other. He pointed out that in such cases there is originally a simple enlargement of the lymphatic glands, due to a hyper-plasia of the normal gland cells, and that throughout, the microscopic structure does not appreciably depart from that of the normal lymphatic gland. Microscopic specimens were shown, from which it could be seen that in the present case this structure was present in the most widely separated parts of the tumour. The disease centering in the lymphatic glands at the roots of the lung, had spread to those of the neck, many of which had attained very large dimensions, some as large as a hen's egg. Further, the growth had involved the pericardium, the posterior layer of this sac being firmly adherent to the principal mass of the growth, and in fact swallowed up in it, the tumour having grown beyond the membrane, and appearing inside the sac as a flat fungating surface. From the parietal-pericardium the tumour had passed on to the visceral layer. On the wall of the auricles of the heart (both right and left) there was a mass of tumour of similar nature attached, distinctly involving the wall of the auricles, but at different parts to a different extent. In some places only the pericardial layer was involved; for the most part, however, the muscular coat as well as the pericardium was lost in the tumour; while in one or two places the endocardium was also involved, the whole three coats being replaced, and the tumour projecting free into the cavity of the auricle. In all these cases the proper tissue of the part was replaced by that of the tumour. In a similar manner the growth had extended into the trachea and bronchi, and into the lung tissue. The right pneumogastric nerve, in a considerable part of its course, and especially where the recurrent was given off, was buried in the tumour, and its tissue apparently, to some extent, involved in it. The left pneumogastric and recurrent were partially adherent to a portion of the mass. It was stated that during life there had been persistent vomiting, and symptoms of laryngeal obstruction. After death, very great swelling of the aryteno-epiglottidean folds was found, especially on the right side.

Some discussion took place as to the difference of such a tumour from a true cancer, and as to the nature of malignancy. Dr Thomas Reid suggested that a test existed in the presence or absence of a tendency to death, apart from the invasion of vital structures.

Dr Dougall exhibited a UTERUS with OVARIAN TUMOUR attached, removed 20 days after parturition. In this case there was no suspicion of ovarian dropsy, till two days after confinement, when the abdomen was seen to be still enlarged. The tumour was successfully tapped twelve days after, 50 ounces of tenacious gruelly fluid being evacuated, and affording relief. A week later, the patient died, and at the *post mortem* 150 ounces of putrid fluid were taken from the tumour. The latter, after being emptied, weighed, along with the uterus, (which was small and quite healthy,) $8\frac{1}{2}$ lbs. Patient had arrived at the full term of utero-gestation. The child was small, but quite healthy, and is thriving.

Dr Alex. Robertson showed a specimen of HORSE-SHOE KIDNEY.

THIRD MEETING, 16th December, 1873.

Dr Strethill Wright showed a man with EXTROVERSION OF THE BLADDER.

Dr Finlayson showed a SPECIMEN OF URINE from a boy with rheumatic pericarditis. It presented a slight trace of albumen, but it precipitated phosphates on heating, and urates and nitrate of urea on the addition of nitric acid in the cold.

Dr Hector Cameron showed a specimen of fluid which had coagulated after removal from a hydrocele of the neck.

Dr Macall Anderson showed a patient, and detailed her case. A young woman æt. 23, for about two years had been subject to headache on the left side, and of late this was accompanied by giddiness. In June, 1873, a soreness began to be felt for a few days along left side of tongue, and in a day or two little tender lumps were felt there, which soon disappeared. As the affection of the tongue improved, the vision of the left eye became affected, and it was said to be blood-shot for a day or two. In a week afterwards the left cheek became stiff, and very marked paralysis of the portio dura on this side became established, which could still be seen. In a fortnight after this paralysis began, numbness, and weakness of the left arm and hand occurred, and immediately afterwards there was a similar affection of the left leg, and subsequently of the right leg; but the affection was only partial. In another fortnight, sudden but temporary pain in the right arm was followed by numbness and weakness of this limb. About April, 1873, she had received a violent blow over the left eye-brow, and had strange sensations in the upper part of the head for eight or nine days. The tongue was protruded in the middle line, but the uvula was deviated to the right. *Dr Anderson* gave reasons for believing the symptoms to indicate the presence of a non-malignant tumour, and after referring to a case published by *Dr James Russell* (*British Medical Journal*, Oct. 24, 1861), said he thought its probable situation was at the pons varolii.

Dr Reid said he had examined the patient, and found hypermetropia, in both eyes, of about $\frac{1}{2}$; the vision in left was reduced about one-half. The ophthalmoscope showed that there was thinning of the choroid; the papilla was oval shaped, and the arteries and veins accompanied by white streaks in both. The upper and inner aspect of disc of left was slightly cupped and occupied by cicatricial tissue. *Dr Reid* thought the symmetrical character of the abnormal shape of discs, pointed to congenital or local rather than to intra-cranial causes. The intra-ocular changes, viewed by themselves, might be accounted for by hypermetropia; but in the light of the other symptoms, it was also possible that they are due to some more general cause—syphilitic or other.

Dr Alex. Robertson thought the headache, paralysis, and affection of the eye, pointed to some inflammatory lesion at the base of the brain, and in particular referred to the congestion of the eye described, as a sign of meningitis.

Dr Finlayson said he thought the facial paralysis was best accounted for by supposing it due to some affection of the nerve in its course. He did not think any one lesion could account for the paralytic affections described, and in view of their partial, transient, and multifiform character, and the satis-

factory recovery of the patient, he thought a syphilitic or a hysterical element was strongly suggested.

Dr Cameron showed (1) a small EPITHELIOMA removed from the cheek (2) an EPITHELIOMA OF SCROTUM removed from a paraffin worker. *Dr C.* said this affection was not uncommon amongst such workers. (3) A leg amputated on account of a large EPITHELIOMA situated in front of a tibia on the site of a scar of an old ulcer.

Dr Reid and *Dr Joseph Coats* showed numerous microscopic sections of these tumours.

Dr MacEwen and *Dr Forrest* showed microscopic specimens of ovarian fluid, and the former made some remarks on the cells supposed by *Dr Drysdale* of Philadelphia to be characteristic of such tumours, and submitted specimens of these. *Dr Joseph Coats* and *Dr Alex. Robertson* said they had examined these carefully with *Dr MacEwen* and had failed to satisfy themselves of the accuracy of *Dr Drysdale's* statements. In particular his test with ether completely broke down in their hands.

FOURTH MEETING, January 13th, 1874.

CIRRHOSIS HEPATIS IN THE CAT.—*Dr Joseph Coats* shewed the liver removed from a cat, and exhibited microscopic sections illustrative of the case. He mentioned that the animal presented great emaciation, with ascitic distention of the abdomen. The entire animal weighed 7lbs. and the liver 9 ounces. The surface of this organ was finely granular; with no very definite cicatricial depressions, but a general minute granulation. On section the tissue was found to be very tough, and, under the microscope, presented the usual appearances of a somewhat advanced cirrhosis. There was a very great increase of the interstitial connective tissue, with corresponding atrophy of the proper liver tissue. The connective tissue had not quite such a highly fibrous character as is common in very advanced cirrhosis in the human subject; but, as was shown, especially in specimens tinted with carmine, contained more round and spindle-shaped cells. The other organs of the body were healthy. It was stated that the animal was known to be six years old, and that the swelling of the abdomen had been first observed about a year before it was submitted to observation. It had been domiciled during the whole of its life in a butcher's shop.

Dr Robertson showed a specimen of PLUGGING OF THE BASILAR ARTERY, through which the vessel was completely obstructed. It had, he stated, occurred in a man, aged 48, who had been admitted into the Town's Hospital on the 14th of December last, and died within 24 hours afterwards. From the history obtained from his wife, it appeared that he had a slight apoplectic seizure about six months previously, from which it was said he had fully recovered. The last attack began five days before admission. From the first he was unconscious and continued so till death. There was no palsy of the extremities, and his breathing was quiet, showing no

approach to stertor. There was no indication of syphilis. At the inspection there was found white softening of the back part of both thalami optici, particularly on the left side. Generally, the posterior lobes of the brain were anæmic, but not softened. Some patches of atheroma were observed in the middle cerebral artery and its branches. The heart, especially its left ventricle, was hypertrophied; the valves were healthy.

Dr Robertson, in his observations on the case, directed special attention to its significance in connection with the distribution of the arteries to the great basal ganglia of the brain, as recently described by Drs Heubner, in Germany, and Duret, in France. These observers had found by injecting coloured liquids into the arteries supplying those parts, that each vessel was restricted to its own particular district, and did not inosculate at all, or only to a very small extent with those which were distributed to the parts adjoining. Hence, as was illustrated by the case submitted to the meeting, where any one of them was obstructed, softening occurred in the area of its distribution, because the collateral circulation could with difficulty be established.

Dr Gairdner showed the heart of a boy with extensive DISEASE OF THE AORTIC VALVES. During life no cardiac symptoms could be said to exist, but there was a loud rushing murmur having an aortic area of distribution. There was great enlargement of the spleen, and some increase of the hepatic dulness. The urine was not excessive in quantity, but was pale, of low specific gravity (about 1.010) and deposited tube casts. Latterly slight dropsy supervened, and death occurred without any marked change in the condition. The heart was found hypertrophied. The aortic valves were competent, but the orifice was much contracted, the valves being covered over with vegetations which dipped down into the ventricle. There were only two distinct semi-lunar valves, one having, however, a rudimentary division. About half-an inch above the valves there was a small aortic aneurism the size of a hazel nut. The foramen ovale was open, and admitted a pencil easily. There were numerous embolic lesions in the spleen, and also some in the kidneys. No amyloid reaction could be obtained in the spleen or kidney. *Dr G.* thought the aortic valves were probably imperfectly formed at birth, rather than that the two segments had coalesced from disease.

Dr Gairdner showed the heart of a patient, described in his *Clinical Medicine*, in whom he had diagnosed TRICUSPID OBSTRUCTION. The man died three or four years ago, when the correctness of the diagnosis was verified. The tricuspid orifice was not constricted, but a globular tumour attached by a hinge to the wall of the right auricle, obstructed the passage of the blood into the ventricle at this point.

Obituary.

THE LATE DR JAMES STEVEN.

JAMES STEVEN was born at Hamilton on the 8th March, 1827. He received his primary education in the Grammar School of that town, under the late Mr Shaw, one of the best of a race of teachers formerly numerous in Scotland, whose main strength lay in the classics. Steven's character there was that which he bore throughout life—plodding and industrious, thorough in his attainments rather than brilliant. In his fourteenth year he entered the Arts classes in the University of Glasgow, and after two years' attendance (in Session 44-45) he began the study of Medicine. His position as a student may be inferred from the circumstance that he obtained his degree of M.D. with honours in 1848. Previously he had resided in the Royal Infirmary as "clerk," or what is now more fitly called "assistant." Of two of his "chiefs" he frequently spoke, one *was* Dr William Thomson, Professor of Practice of Medicine in the University, the other *is* Dr William Weir, then one of the Physicians to the Infirmary. Dr Steven seems to have got further than others into the sympathies of the professor, so far, indeed, as to have contracted a sincere liking for the man. A couple of *silhouettes* of Dr Thomson, found among Dr Steven's papers, carry us back to those Infirmary days, their preservation speaking to the kindly associations of that odd profile.

One of Steven's townsmen and fellows in school and college was Robert Anderson, who, after a brilliant career as a student both in arts and medicine, died of cholera at Cairo in July, 1848. The appearance of the same epidemic in Scotland in the autumn of that year led to Dr Steven's first professional engagement, as one of a staff organized by Dr Sutherland for temporary service in Dumfries. At the end of the year he acted in similar circumstances in his native town, where he was appointed Chairman of the Local Board of Health, and had charge of the medical staff intrusted with the management of the epidemic. The characteristic thoroughness of his work is still attested by a careful record of 1194 cases of choleraic disease, the first entered 24th December, 1848, the last 7th March, 1849.

In the autumn of 1849 Dr Steven commenced practice in Glasgow. In 1851 he was elected a Fellow of the Faculty of Physicians and Surgeons, of which he had become a licentiate in 1848. His subsequent path was in the "sequestered vale" of the life of a general practitioner. After serving some time as a Dispensary Physician, he was in 1864 elected one of the Physicians to the Royal Infirmary. In 1869 he was made Vice-President of the Medico-Chirurgical Society. Dr Steven was also a Trustee of Anderson's University, and for many years a member of the Examining Board of the Faculty.

When, after nearly twenty years' suspended animation, this *Journal* was revived in 1854, Dr Steven became joint-editor with Dr G. Buchanan and Dr Cowan, and continued to be so for three years. In the second volume he published two papers "On the Convulsive Affection which occasionally manifests itself in the course of Typhus, and its probable connection with Nephritic Disease." The material of those papers was collected while he was clerk in the Royal Infirmary fever-house, and is a good sample of the carefully recorded and intelligently annotated cases, and sketches of papers with which Dr Steven filled several MS. volumes during the first years of his

professional life. The only other published paper is a short "Case of Soft Sarcoma of the Cerebellum" in the third volume of this series.

The bent of Dr Steven's mind was not towards literary effort but to business—to affairs. He was able to take a singularly clear and dispassionate view of the activities of others. His part was that of the bearings in a well-constructed machine, which do not become overheated though surrounded by excited motion. His mental characteristics were more those of the lawyer than the doctor. Such business capacity is rare in the medical profession, and therefore Dr Steven was in his day pre-eminently a useful man, though his usefulness was of the sort which secures no better guarantee of fame than reputation in the minds of observing coadjutors. It is, therefore, in the current business of the Faculty, the Andersonian, the Medico-Chirurgical Society, and the Glasgow and West of Scotland Medical Association, that Dr Steven has left the most noteworthy traces of his existence. He had a sharp eye for irregularities of procedure. He believed that he had somewhat improved the method in Faculty business. As a trustee of Anderson's University he bestowed much study on the text of Dr Anderson's will, and had effected some reforms and attempted others tending to conformity with its provisions. When, in 1868, the Glasgow and West of Scotland Medical Association was constituted for the support of this *Journal*, Dr Steven took an active part in the preliminary arrangements, and again gave his services on its behalf by accepting the office of Treasurer, which he held for five years, and only resigned on his death-bed. He had a very deep and genuine interest in the *Glasgow Medical Journal*, and his name will always deserve honourable mention in the history of its fortunes.

Dr Steven's private character was exceptionally consistent with the prominent features of his public life. Quiet practical affection, with sobriety and order in all things were evident. He did his duty as a husband, father, and friend conscientiously and wisely, but without display or sentiment. By most he was credited with a tendency to sarcasm, which sometimes arises from an austere love of reality. To see and speak of things as they are, instead of as they are conventionally regarded, is enough to win the name of sarcastic, or even cynical. Dr Steven often spoke of men and actions in this pre-Raphaelite style, neglecting the softening haze of sentiment.

Dr Steven is said to have been delicate in his childhood. In adult life he never had any serious illness, until he suffered from erysipelas of the head, some two years ago. His uniform health, with extreme regularity of life, held out every prospect of longevity. All such prospects were suddenly obscured on the 26th of last June, when slight oedema of the feet led to the detection of renal disease. With that frank and calm apprehension of the truth which was his habit, he passed at once from the position of a man hopeful of life, to that of one the end of whose life is visible. The way to it was wearisome and painful, though not long. He died on the morning of Sabbath, 30th November, 1873.

THE LATE SURGEON-MAJOR STEWART, ROYAL ARTILLERY.

MANY of the readers of the *Journal* will have observed with regret a notice of the death of William Kippen Stewart, M.D., Surgeon-Major of the Royal Artillery, which took place at Allahabad, India, on the 30th January last. Dr Stewart was a son of the much respected minister of the parish of Kilmory, Arran. He was educated at Glasgow University, and resided

for two years at the Royal Infirmary as one of the clinical assistants. He was a contemporary of the late Drs Andrew Buchanan and George Rainy, and from his genial disposition and gentlemanly demeanour was greatly beloved by a large circle of friends. After leaving the Infirmary, he joined the Army Medical Service, and while attached to one of the Highland regiments was in active service during the Indian Mutiny, and was present at the relief of Lucknow. Dr Stewart seems to have greatly distinguished himself in India and China, for we find him at an early period of his career raised to the rank of Surgeon, and soon after to that of Surgeon-Major. He died at the early age of thirty-nine years, from aneurism of the arch of the aorta.

BOOKS, PAMPHLETS, &c. RECEIVED.

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- The Anatomist's Vade-mecum, a system of Human Anatomy, by Erasmus Wilson, F.R.S., Edited by George Buchanan, M.D., Professor of Anatomy, in Anderson's University, assisted by H. E. Clark, M.R.C.S., pp. 744. London: Churchill, 1873.

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THE
GLASGOW MEDICAL JOURNAL.

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Original Articles.

I.—ON CONGENITAL MALFORMATIONS OF THE LOWER JAW.

By ALEXANDER OGSTON, M.D., *Aberdeen.*

THE subject of Congenital Malformations of the Lower Jaw has hitherto attracted but little attention. A few isolated cases are to be found here and there in medical books and magazines, and one or two imperfect attempts to collate them and bring the matter into a definite shape exist, chiefly in foreign literature. The difficulties inherent in the subject are twofold. In the first place, cases of these malformations are very rare, forming a marked contrast in this respect to those of the upper jaw, so fully studied and so usual in the experience of every surgeon; and, in the second place, the cases which have been put on record by no means harmonise, at first sight, among themselves, and have even been deemed capable of very different explanations.

The following attempt to bring what is known of these malformations in a connected form before the profession, has been dictated, not by the expectation of clearing off all the obscurity of the subject, but by a desire to lay before English readers in a form sufficiently complete for use, the scattered records which exist, and to claim for the subject

the attention it deserves. Its imperfections will be forgiven by those who know the difficulties besetting a provincial practitioner in his attempts to obtain the complete literature of any medical question.

The immunity of the lower jaw from deformity, already alluded to, seems to be as marked a feature in its later as in its earlier stages of development. It is found that irregular position of the teeth (a mere mechanical accident), and the formation of tumours,* are equally common in both jaws; but what may be called vital processes, such as the malformations of congenital syphilis, and the deformities specially connected with mental development,† are most marked and most frequent in the upper jaw.

The congenital malformations, which are alone treated of here, exist in various forms and degrees.

I.—NON-DEVELOPMENT OF THE INFERIOR MAXILLA

has never been recorded in man, except where the cranium was at the same time deficient, but it has occasionally been noticed in the lower animals, as in the following instances. Vrolik‡ depicts the head and skull of a new-born rabbit, the subject of cyclopia, though with two eyeballs, where there existed no trace of a mouth. A single optic nerve supplied a branch to each eyeball. A small fleshy tubercle took the place of the tongue. There were no traces of an inferior maxilla, although the zygomatic apophyses of the temporal bones were present. The zygomatic arches were absent. The hyoid bone, larynx, trachea, and œsophagus were normal.

Also,§ the head of a new-born sow with cyclopia and absence of the inferior maxilla. The eyes were sufficiently apart for the snout to be situated between and above

* Otto Weber. *Krankheiten des Gesichts* (Pitha and Billroth's Surgery), page 261; and Magitôt, *Kystes des Mâchoires*. *Arch. Gén. de Méd.*, April, 1873.

† Langdon Down. *Relation of Teeth and Mouth to Mental Development*; *Transactions of Odontological Society*, Nov. 6, 1871.

‡ Vrolik. *Tabulæ ad Illustrandam Embryogenes in Hominis et Mammalium*, 1849. Tab. lviii. Figs. 1-5.

§ Vrolik, *Op. Cit.*, Tab. lviii., Fig. 6.

them. The upper lip ended in a long point partly supported by the upper jaw. Beneath this was the aperture of the mouth, directed backwards. The ears were natural in position.

And,* the skull and encephalon of a new-born sow with cyclopia and absence of the inferior maxilla. The two eyeballs were fused into one. There were four eyelids, and a proboscis above the eye, but no trace of a mouth. The tongue and hypoglossal nerve were wanting, but the larynx and oesophagus were normal.

Vrolik also,† quoting from Otto, Tab. III., fig 2, gives a drawing of the head of a new-born male lamb, which exhibited cyclopia, absence of the inferior maxilla, and no trace of a mouth. Here the trifacial nerve was small.

Further,‡ the head of a new-born lamb with acrania, cyclopia, and absence of the inferior maxilla, a small cutaneous papilla taking the place of a mouth.

And lastly,§ the head and skull of a lamb where absence of the lower jaw was conjoined with deficiency of the face.

II.—EXCESSIVE DEVELOPMENT OF THE LOWER JAW

has been observed in a few instances, where it appears to have affected both halves equally. The cases are:—

1. Otto|| briefly describes the skeleton of a human hemicephalic monster of the seventh month of pregnancy, which was further affected with spina bifida in the cervical region. The arch of the calvarium was wanting. The base of the skull was present. The roofs of the orbits were short and depressed. The facial bones were prominent. The palate was cleft at its back part between the palate bones, "*mandibula maxillam superiorem longitudine multo superat.*" All the cervical vertebræ, of which only four existed, and the upper five dorsal vertebræ, were cleft behind, and were

* Vrolik, Op. Cit., Tab. lviii., Figs. 7-10.

† Vrolik, Op. Cit. Tab. lviii., Fig. 11

‡ Vrolik, Op. Cit. Tab. lviii., Figs. 12 and 13.

§ Vrolik, Op. Cit. Tab. lviii., Figs. 14-16.

|| Otto, *Monstrorum Sexcentorum Descriptio Anatomica*, 1841, p. 36.

partly fused together. The dorsal vertebræ were twelve in number, but the upper ones were small and oblique. The left ribs were normal in number; the right ribs numbered nine, the upper ones being deficient.

2. Otto * describes another case exactly similar, but without the spina bifida.

3. And a third case,† concerning which he simply states, "*Mandibulæ, ut fieri solet, magnæ et prominentis synchondrosis abnormem continet nucleum osseum.*"

It must be admitted that these three cases are far from being a convincing proof of the existence of a congenital preponderance of size of the inferior maxilla. In all of them the increase may not have been absolute, but merely relative; the upper jaw may have been unusually small, and thus have given rise to the apparent magnitude of the lower. They are in the original mere sketches without minute details or plates, and although in the first it is expressly remarked that the facial bones were prominent, the suspicion arises that they may have been similar in their nature to the cases of which I now quote two for the sake of comparison, and where diminution of size or alteration of position of the superior maxilla gave to the lower jaw an apparent magnitude which did not really exist.

(a.) Vrolik‡ gives drawings and descriptions of the heads

* Otto, Op. Cit. Case lix, p. 37.

† Otto, Op. Cit. Case lx., p. 37.

‡ Vrolik, Op. Cit. Tab. liii., Fgs. 1 and 2; and Tab. liii. Figs 8 and 11.

PLATE I.

Fig. 1. Apparent increase of size of the lower jaw from imperfect development of the upper jaw.

(a) Membranous condition of the orbital plate of the frontal bone.

(b) Membrane representing the ethmoidal notch of the frontal bone and the deficient ethmoid bone.

(c) Malar bone.

(d) Zygomatic process of the temporal bone.

(e) Superior maxillary bones imperfectly developed and fused together.

Fig. 2. Apparent increase of size of the lower jaw from imperfect development of the upper jaw. Rudimentary condition of the nasal bones.

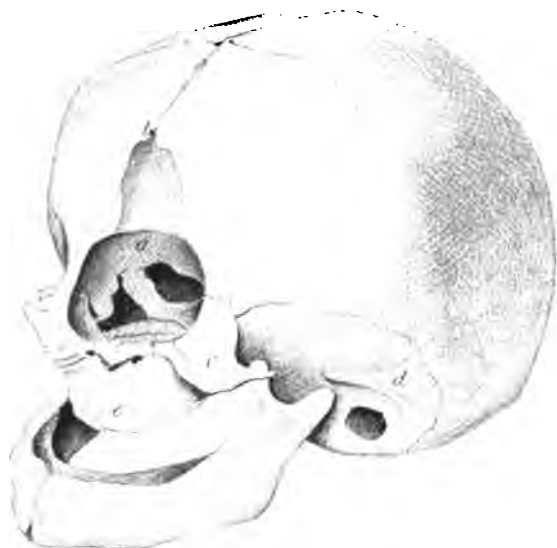


Fig. 1. after Vrolik.



Fig. 2. after Vrolik. Digitized by Google

and skulls of two infants born with cyclopia, where the superior maxillary bones were small, and the inferior maxillæ correspondingly prominent. From his Plate LIII. Fig. 2, I have copied the skull of the former of these, as it is more characteristic than any description (*see Fig. 1*). The orbital part of the frontal bone (*a*) was absent, and replaced by a membrane. The ethmoid bone was absent, and the ethmoidal notch (*b*) of the frontal bone was replaced by a membrane. The zygomatic process of the malar bone (*c*) was not in contact with the zygomatic process (*d*) of the temporal bone. The two superior maxillary bones (*e*) were imperfectly developed and fused into one. The vomer, nasal, and turbinated bones were wanting, "*Maxilla inferior valde eminet.*"

(*b.*) Still more marked is the case* given by the same author, the drawing of which I have reproduced in Fig. 2. Here the lower jaw is much too long for the upper, and has its angle unusually obtuse. The nasal bones are mere rudiments placed between the frontal and superior maxillary and the nasal processes of the latter bones are broad, so as to meet each other in the mesial line, where they are fused together. The bodies of the superior maxillary bones are small, and their alveolar processes appear to contain one molar tooth less than usual, while the inferior maxilla has space for the full complement.

III.—CONGENITAL SMALLNESS OF THE LOWER JAW.

The cases of this on record are more numerous than those of the deformities already discussed, and they have received a larger share of attention, although the views held by the various authors regarding their causation have been unsatisfactory, and even contradictory.

Before passing on to consider more closely the forms in which congenital smallness has been met with, it will be well, as a help towards a better understanding of them, to bear in mind the knowledge we possess regarding the normal development of the inferior maxilla. More light has been

* Vrolik, Op. Cit. Tab. lxi. Fig. 5.

thrown on this by Hüter* than by any other recent author. He has shown that there is little increase of size, between birth and adult development, in the portion bearing the incisor and canine teeth, while the segment bearing the bicuspid and molars is enormously developed in proportion to the rest of the jaw during the like period of time, and this fact has to be kept in mind in the study of congenital smallness, as it is of consequence to observe what relation the jaw bears in each to the number and size of the teeth. Hüter is of opinion that the increase in the number of the molar teeth at the second dentition, is the cause of the increased growth of the molar segment; while the incisor segment, having always the same number of teeth, does not grow in the same ratio. The ingenuity with which he supports his conclusions does not however blind us to the fact, that the lower border of the molar segment, though not influenced by the teeth in any way, grows equally with the upper border, and that the influence of the teeth, if acknowledged as a sufficient cause, would lead us to expect an increased obtuseness of the angle of the jaw, instead of the diminished obtuseness which is observed between infancy and manhood. Hüter attributes the production and growth of the angle of the jaw to the resistance offered to its elongation by the temporal bone at one end, and the muscles and integuments of the chin and lower lip at the other, an explanation similar to that which he has applied to the ribs. But the bend produced in the lower jaw is invariably an angle, not a curve, as such pressure would lead us to expect, and takes place at a definite point, a fact which his hypothesis of increased periosteal activity on the lower, and diminished activity on the upper margin, does not make in the least more intelligible. Of all Hüter's observations, the greater development of the molar than of the incisor portion is the one which chiefly concerns us. Congenital smallness of the lower jaw has been found affecting one or both halves, and these two series of cases will be considered separately.

* Hüter, Virchow's Archiv. Bd. xxix., p. 21. Digitized by Google

A.—Congenital Smallness of both halves.

Vrolik* mentions this as occurring in animals, and in the human subject it is said to have been noticed in new-born children by Moschner, Schubarth, and others.† The works of these latter authors are inaccessible to me, but I have collected the following series of cases illustrative of the above deformity, from the works which I have been able to obtain.

1. Otto‡ gives a drawing and description of a seven months' foetus, the subject of hydrancephalocele, concerning whose maxillæ he remarks,§ "os apertum et eo valde deturpatum est, quod margo superioris maxillæ sex lineas præ margine inferioris maxillæ et mento prominet, ita ut labium superius inferiori non sit impositum sed propositum." From the drawing it seems probable that the inferior maxilla was here of unusually small size.

2. The same author,|| in describing an infant that lived three hours, and possessed supernumerary fingers and toes, remarks "Maxilla inferior paullo brevior est, cæterum normalis," and

3. In describing¶ a monstrous new-born infant with incurved upper extremities, says, "labium superius et maxillæ superioris margo dentalis bene se habent; palatum bene fornicatum atque latum est. Mandibula autem tam brevis et parva est, ut mentum ceteroquin satis rotundatum, limbus alveolaris inferior et lingua nimis retro posita sunt. Itaque maxilla superior præ inferiore dimidium pollicem prominet. * * * nervi hypoglossi, glossopharyngei et rami linguales quinti paris non sunt imminuti, quamvis parva sit lingua. Mandibula brevissima, sed dura et crassa et in synneurosi sua nimis ossificata est; protuberantia ejus mentalis simul est eximia et in acutum quasi marginem desinet." This description leaves no room to doubt that Otto is describing an abnormally small lower jaw, though cases 1 and 2 are so incomplete as to be open to some doubt.

4. Vrolik** reproduces a case described by Von Am-

* Vrolik, Op. Cit., Pl. lix.

† Weber Op. Cit., p. 292.

‡ Otto, Op. Cit., No. lxxiii., Tab. ix., Fig. 3.

§ Otto, Op. Cit., p. 47.

|| Otto, Op. Cit., p. 271.

¶ Otto, Op. Cit., pp. 322-323.

** Vrolik, Op. Cit., Pl. lvii., Fig. 18.

mon * where diminutive size of the mouth and lower jaw coincided (*see Fig. 3*). Both lips were laterally contracted, and too small. At the same time the inferior maxilla was too short, a vice of conformation which was also present in all the sisters of this infant. At first the child could not open the mouth, but prepared sponge was with difficulty introduced into it, and it was at length dilated to such an extent that the child could take the breast. There existed a cleft palate "to an extent remediable by staphyloraphy."

5. A case similar to the above in its nature has come under my own observation, the details being as follows.

The wife of a merchant in Aberdeen gave birth, on the 28th April, 1869, to a female child. She had previously given birth to two perfectly formed children, and has since borne two others, also perfectly formed. Neither she nor her husband was affected with any deformity; they were not related to each other before marriage, and no malformation or mental disease was known to exist, or at any time to have existed, among their relations. At the time of the child's birth nothing unusual was observed about it, until its inability to swallow was observed by the nurse and the physician in attendance. The child could not swallow nourishment either from the spoon or breast, and fluids put into its mouth regurgitated through the nose. The physician in attendance having his attention awakened, had now no difficulty in observing a markedly diminutive size of the lower jaw. An eminent surgeon, whom he called in consultation, confirmed his observation, but discovered nothing else. The child died of starvation on the 1st May, having lived only four days. I was requested to make a post-mortem examination, which I did, in the presence of the medical attendant and of the surgeon who had been called in consultation.

The child was an unusually large female infant, somewhat emaciated, but presenting otherwise nothing notable externally save in the region of the lower jaw. This bone was disproportionally small. The upper lip was more in front of

* Von Ammon, *Angeborene chirurgische Krankheiten*. Taf. iv., Fig. 15.

the lower lip than usual, and in the central line the margin of the upper gum was a considerable distance in front of the margin of the lower gum. The lips were well formed, and the tongue was natural in size and position. There was no hare-lip, but both hard and soft palates were wanting, and the vomer ended inferiorly in a rounded margin continuous in front with the alveolar process of the upper jaw. On either side of the vomer the absence of the palate afforded a free view of the three turbinated bones and meatuses of the nose. The nasal cavity thus exposed was normal, except in so far as the absence of the palate deprived it of its floor, and allowed the freest communication with the mouth, the two forming but one single cavity. No other abnormal development was remarked in the child.

After preparation of the inferior maxilla its condition was found as follows: Its two halves were still ununited, save by a cartilaginous seam, in which a centre of ossification existed in the form of a perpendicular plate, extending from the lower border of the symphysis upwards for two-thirds of its vertical measurement. Each half contained the full number of tooth sockets present in the normal infantile jaw. The whole bone was well formed, well proportioned in its several parts, and quite symmetrical, but unusually small. Its measurements were considerably less than those given as normal by Hüter.* I give them in the decimal system for contrast with his figures:—

	Centimetres.	Centimetres.
From angle to symphysis, external measurement ($1\frac{1}{2}$ in.),	3.4	instead of 4.0
Length of the lower border of the bone from angle to angle, external measurement ($2\frac{1}{2}$ in.),	6.8	„ 8.0
From the angle to a line passing perpendicularly downwards from the posterior part of the condyle, the bone resting on its horizontal rami ($\frac{1}{2}$ in.),	1.3	„ 1.5
From angle to condyle, external measurement ($\frac{3}{4}$ in.),	1.6	„ 1.8
From one canine angle to the other, external measurement ($1\frac{1}{2}$ in.),	2.1	„ 2.5
From canine angle to root of coronoid process, do. ($\frac{3}{4}$ in.),	1.8	„ 2.2
From front of symphysis to middle of a line joining the angles ($1\frac{1}{2}$ in.),	2.4	
From front of symphysis to middle of a line joining the back parts of both condyles ($1\frac{1}{2}$ in.),	3.5	
From condyle to condyle, external measurement ($2\frac{1}{2}$ in.),	5.7	
From angle to angle, external measurement (2 in.),	5.1	

* Hüter, Op. Cit.

All the other parts of the child were well formed, no want of symmetry of the cranium was observed, although this was not especially looked for.

In all the above cases the diminutive size of the lower jaw was accompanied by symmetrical deformity elsewhere, although none of them give the slightest clue towards the discovery of its causation. It will be observed that in cases 3 and 5, the only ones given much in detail, and probably also in the others, the malformation of the lower jaw was confined to a diminution of its size as compared with that of the upper jaw, without any alteration of the outlines or proportions of the different parts of the bone. That such alterations are occasionally met with, however, the following observations, the only ones recorded, convincingly prove.

6. Vrolik* gives a description and plates of the skull of an adult male from his own museum, where the lower jaw is too short, and at the same time removed too far backwards. In the skull (*see Figs. 4 and 5*) the greater wings of the sphenoid were so expanded, and the temporal bones were placed so far back, that the articular surfaces for the inferior maxilla, and the lower jaw itself, lay far back towards the posterior part of the head. Hence the lower maxilla was too short to correspond with the superior maxillary bone. To this disposition of parts was added a sinking downwards of the occiput, and a consequent elevation of the central portion of the base of the skull, so that the alveolar ridge of the upper jaw, sloping downwards in front, occupied an oblique position, and the base of the skull appeared shortened and contracted. This formation of the skull exerted an influence

* Vrolik, *Op. Cit.* Tab. lx., Figs 2, 3, and 4.

PLATE II.

Fig. 3. Mouth and nose of a child born with deficient size of the mouth and lower jaw, and described by von Ammon. Case 4.

Fig. 4. Congenital shortness of the lower jaw and other deformities of the skull. Case 6.

Fig. 5. Base of the above skull, lower jaw removed. Case 6.



Fig. 3, after Vrolik.

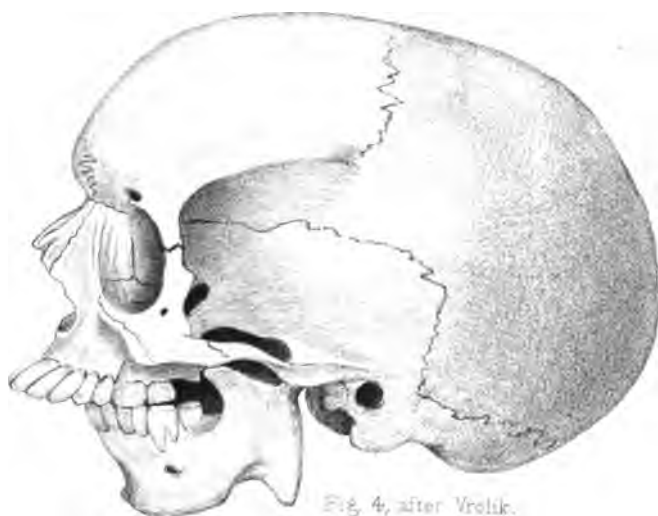


Fig. 4, after Vrolik.



Fig. 5.

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on the zygomatic arch, the middle portion of which was moved upwards. Consequently the temporal and superior maxillary bones were mutually approximated, and the foramen magnum of the occipital bone was situated far back in the centre of the base of the cranium. The alveolar processes of both superior maxillary bones were very small, and contained only four molar * teeth each, which number corresponded with the shortness of the palate, and with the diminished length of the alveolar processes. The alveolar processes of the inferior maxilla (*see Fig. 6*) were equally short and contained likewise only four molar teeth each. The incisor teeth of the upper jaw were directed unnaturally forward, and when the lower jaw was drawn as far as possible backwards, its incisor teeth reached only to the canines of the upper jaw, the posterior molar tooth on each side being left free. Owing to the backward displacement of the lower jaw, the want of prominence of the chin, the projecting position of the upper incisors, and the flat and sloping forehead, the skull acquired a bestial character, which, during life, must have given the face an unpleasing aspect. The angles of the lower jaw terminated on each side in a point continuous with the perpendicular posterior margin, and which was bent outwards and separated by a semilunar notch from the inferior margin.

"The cause of this change of form," adds Vrolik, "is the greater force required to enable the masseter to bring forwards the lower jaw. The same cause has changed the form of the coronoid processes of the lower jaw. These project forwards, ending in an acute point, whence their posterior has rather become their superior margin. The temporal muscle exercised its action principally on this margin, and hence the apices of the coronoid processes are directed forwards and bent inwards. They therefore assume the same direction as in the rodents. From the same cause the condyles of the lower jaw are changed into oblong eminences, which cannot effect an arthrodia, but which can be thrust forwards and drawn back with great ease. Hence it follows

* Vrolik included the bicuspid among the molar teeth.

that the glenoid fossæ of the temporal bones must accommodate themselves to this disposition of the lower jaw. They have lost their transverse direction, and are changed into longitudinal grooves. But all these alterations are not congenital, but have probably arisen in the course of time from the constant backward and forward motion which the inferior maxilla underwent in order to suit its front teeth to those of the upper jaw. From the repeated impulsion of the lower against the backs of the upper incisors, the latter have assumed their marked direction forwards. From the same cause a groove has been worn in the centre of the crowns of the molar teeth similarly to what is observed in the Rodents. Thus the peculiarities of this skull are dependent on each other, and have one common cause, viz., the congenital shortness of the lower jaw."

It may at once be admitted that Vrolik's explanation is probably correct so far as regards the form of the lower jaw, the position of the upper incisors, and the temporo-maxillary articulation, but there is more in the above case than can be thus explained, for the greater arching of the base of the skull and the asymmetry of the cranium (which, though not mentioned by Vrolik, is shown in his plates to have been present) cannot have been thus produced. The want of symmetry of the cranium is found in other cases to be a usual accompaniment of malformations of the lower jaw, and seems in the above case to have been coetaneous with the deformity of the jaw rather than to have been produced by it. The absence of the four wisdom teeth may have had something to do with the shortness of the alveolar circuit in both upper and lower jaws, and so far would bear out Hüter's views, but it is difficult to see how any more extensive bearing can fairly be claimed for it on this case.

7. Von Langenbeck* has recorded the following interesting observation:—He was consulted by a young man, aged 18, who presented the undermentioned condition of the lower jaw. The three molar teeth were absent on each

* Langenbeck. Archiv für Clinische Chirurgie. Bd. I. Heft II, pp. 450-56. Taf. V. Figs. 1-3.

side, the bicuspid was present, and the jaw itself was considerably smaller than usual. Its incisor teeth stood so far back in relation to those of the upper jaw, that the latter were anterior to the lower lip. The development of the inferior maxilla was less imperfect in its lateral than in its antero-posterior dimensions, for the masticating surfaces of the right bicuspid were in intimate contact with the teeth of the right upper jaw, and the left lower bicuspid was separated from the teeth of the left upper jaw by only a narrow fissure. The angles of the jaw were considerably more obtuse than is usual in the adult. There existed also a faulty direction and length of the coronoid processes, which, when the mouth was attempted to be opened, became so locked or jammed against the posterior surface of the zygoma that the teeth could not be separated. The want of proper nourishment to which this state of matters gave rise was telling on the condition of the patient. The coronoid process on each side was reached by Langenbeck from the cheek and sawed through, with the result of completely remedying the closure of the jaws, and restoring to them their proper mobility.

The cases adduced above, which are all, or almost all, that have been recorded, are too few in number to enable any very valid deductions to be drawn. So far as may be judged from them, however, *congenital smallness of the lower jaw does exist*, though rarely, and is *usually conjoined with symmetrical deformities elsewhere*, such as cleft palate, &c. In some cases the jaw so affected carries a diminished number of teeth, in others this is not the case, and at all events the absence of some of the teeth is more probably a consequence of the cause which has produced the smallness of the jaw, than itself capable of explaining the origin of the smallness. It seems further justifiable to conclude that, *where the subjects of this deformity survive to adult life, they are not unlikely to become affected by such superadded deformity as was present in Vrolik's case (Figs. 4, 5, and 6), or the form of locked jaw described by Langenbeck (Case 7.)*

B.—Congenital Unilateral Smallness of the Lower Jaw.

Only two cases of this peculiarity are to be found in medical writings, and I am fortunate in being able to contribute a third.

Before entering on the subject, it may be well to consider the results likely to be produced by such a peculiarity, on the form and position of the lower jaw as a whole. These might be expected to vary to some extent according to the time of foetal life when retarded development of the one half began to exercise its influence on the other half, and also according as the difference in size of the two halves was greater or less. If the disproportion between the two sides were very considerable, and made itself felt before the formation of the articulation of the condyle with the temporal bone, it might be expected that, in spite of *compensatory deviation of the unaffected half*, the continued growth of the latter would to a certain extent pull its smaller neighbour out of position, and by drawing it forwards detach it from its relations with the glenoid cavity so as to *prevent the formation of an articulation with the temporal bone* at all. Where on the other hand the disproportion was to a less extent, it might occur that a slight *displacement of the sound half* towards the affected side would suffice to leave the malformed half in its proper relations, and even allow an articulation with the corresponding glenoid cavity to be established.

Of the former class of cases, where the disproportion has been too great to be compensated by a deviation of the unaffected ramus towards the affected side, and hence the affected ramus has been drawn away from the glenoid cavity of the temporal bone so that no articulation exists, only a single example (Case 2) has hitherto been met with, and it was named by the author narrating it *congenital luxation of the lower jaw*. A study of the case will, however, show that this name has been badly selected, and we will take occasion to point out, farther on, that this has been acknowledged by the author himself.

Case 1 is similarly the only instance known of the slighter

form of the affection where the malformed half maintains its relation to the glenoid cavity.

1. Vrolik* describes a new born infant where the following deformities co-existed. The forehead was depressed, and the vertex of the skull high. The eyes were sunken, and concealed by the closely contracted lids. Beneath the nose, which was very broad, was the aperture of the mouth with the lower lip inverted. The chin was drawn far back. The ears were almost flat, and each provided with an incurved edge; they were folded inwards nearly to the membrana tympani; but, beyond the above, they possessed neither concha, tragus, nor antitragus, although a sort of lobule existed below. The neck was short and the thorax broad. The extremities were short and furnished with superfluous digits: the hands bearing six fingers besides the thumb, and the feet six toes each. The umbilicus was midway between the sternum and the pubis. Genitals malformed (spurious male hermaphroditism), testicles retained. A previous child of the same mother was said to have been similarly deformed.

The skull and lower jaw when prepared showed the following peculiarities (*see Figs. 7, 8, and 9*). The cranium was not symmetrical, having a direction obliquely from right to left, so that on the left side the exterior was more convex and regular than the right side, which was, so to speak, flattened, and recovered its globular form only in the region of the parietal tuberosity, where it was even a little elevated. The face was also oblique. The orbital margins (*Fig. 7 a.*) were compressed from above downwards, hiding the deeply placed eyes. The nasal bones (*b*) were broad and convex. The superior maxillary bones (*c*) were short and narrow. The inferior maxilla was so retracted (*Fig. 7 d and Fig. 8*) that it scarcely reached half-way forwards on the palate. It had an abnormal shape, and was composed of only one bone, the right ramus of which was one-fourth longer than the left (*Figs. 8 and 9*), rendering the whole maxilla oblique. The chin was not straight in the middle,

* Vrolik, *Op. Cit.*, Tab. LX., figs. 4 and 5; and Tab. LXI., figs. 1, 2, and 3.

but was deflected to the left side where it terminated in a point. At the external surface of the angle the bony margin was broad and turned outwards. At the posterior and internal surface, near the posterior maxillary foramen, a short and thick piece of bone (*Fig. 9 a a*) was situated, though its nature was not easy to determine. The condyles (*Fig. 9 b b*) were more broad than round, and were horizontal in direction. The coronoid processes (*Fig. 9 c c*) were much everted. In the base of the cranium the following points were specially remarkable, viz., the broad and almost horizontal pterygoid processes, the very broad alæ majores of the sphenoid (*Fig. 7 e*), and the backward direction of the temporal bones (*Fig. 7 f*), by all which the base of the skull was increased in length, and the occipital foramen pushed too much backwards and downwards.

A glance at figure 8 will show, I think, that the size of the right lower maxilla is almost or nearly normal, that it would, if properly placed, occupy a normal position in regard to the right superior maxillary bone, and that it is mainly the brevity of the left lower maxilla which causes its deviation to the left of the mesial line, since it is compelled to contribute more than its due share to the completion of the circuit of the alveolar ridge. We have here to do with an asymmetrical skull, with deficient development of the left lower jaw (the right lower jaw being unaffected or less affected), a state of matters entitling the case to rank as a less marked example of those which I shall next adduce. It is further noteworthy that the condition of the coronoid processes and angles of the lower jaw is similar to those in Cases 6 and 7.

2. Professor Robert William Smith, of Dublin,* has put

* R. W. Smith, M.D., on Fractures in the Vicinity of Joints, and certain Accidental and Congenital Dislocations. Dublin, 1847. Chap. ix., pp. 273, &c.

PLATE III.

Fig. 6. Lower jaw of Fig. 4 detached from the skull. Case 6.

Fig. 7. Congenital unilateral smallness of the lower jaw; side view. Case 1.

Fig. 8. The same seen from below.

Fig. 9. Lower jaw of the same.



Fig. 1, after Vrolik.

a, contracted orbits *d*, retracted and depressed lower jaw *g*, frontal bone
b, broad and convex nasal bones *e*, lateral alae majores of sphenoid bone *h*, parietal bone.
c, short and narrow superior maxilla *f*, temporal bone drawn backwards *i*, occipital bone

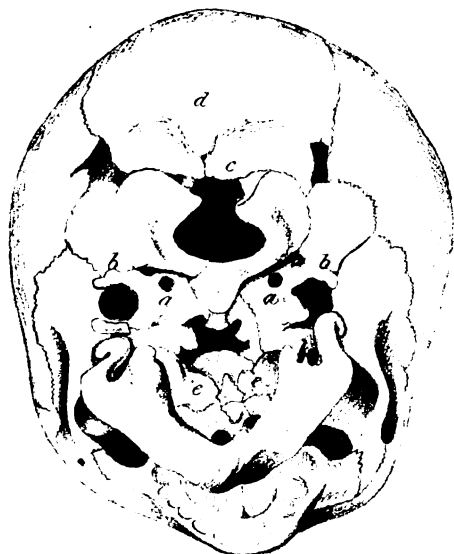


Fig. 2, after Vrolik.

a, petrous portions of temporal bones *c*, torus in maxilla.
b, tympanic rings *d*, occipital tuberosity.
e, wormian bones

Fig. 3,
after Vrolik.

a, bony prominences of doubtful nature
b, condyles
c, everted coronoid processes



Fig. 4, after Vrolik.

on record this carefully and minutely observed case. Edward Lacy, aged 38, the subject of congenital idiocy, died in the Hardwicke Hospital of bronchitis and gangrene of the lung. Dr Smith, when engaged in making a post-mortem examination of his body, was struck with the peculiar deformity exhibited by his face, and which is represented in Figure 10. The right side of the face was small and atrophic, presenting, in the situation of the zygoma, a concavity in place of a convexity, and, in the parotid space, a very distinct depression. The countenance was crooked; the right angle of the mouth was higher than the left; the right orbit was lower than the left orbit; the right superciliary arch less projecting, and the right eye less prominent. The right side of the face appeared sunk in, and the tip of the finger could be placed between the parotideal margin of the jaw and the front of the external auditory canal. The right masseter was atrophic; the right temporal and pterygoid muscles were smaller than those on the left side, but their muscular structure seemed normal. No appreciable difference existed between the nerves of the two sides of the face. On the affected side the external lateral ligament of the temporo-maxillary articulation was directed obliquely forwards instead of backwards, and was attached to an imperfect condyle, which was at least a quarter of an inch separated from what should have been the glenoid cavity. Periosteum took the place of the cartilages of incrustation, and the inter-articular cartilage was absent. There was no capsular ligament. The right side of the maxillary bone (*see Figs. 11, 12, 13, and 14*) was smaller than the left, and was atrophied in every measurement from the symphysis backwards. The transverse diameter of the ramus was half an inch less than on the left side, and the right parotidean margin was half an inch shorter than on the other side. The lower margin of the right half presented a concavity at its posterior part (*Figs. 11 and 12*); the angle was prominent and excurved (*Fig. 11*); and the parotideal margin (*Fig. 12*) was thin and concave at its upper part, formed nearly a right angle with the body of the bone, and

terminated above (*Fig. 14*) in a small curved process, directed nearly horizontally inwards, its superior surface being turned slightly outwards, and its inferior surface slightly inwards. This process, in form somewhat resembling the coracoid process of the scapula, was the only vestige of a condyle, but was destitute of cartilage. The external pterygoid muscle was attached to its anterior and inner part, and the external lateral ligament to its outer surface. The coronoid process was thin and small, and the sigmoid notch could scarcely be said to exist. On the right temporal bone the zygomatic process (*Fig. 12*) was arrested in development; the articular eminence was absent, and instead of it there was merely a flat surface destitute of cartilage. The superior or longitudinal root of the zygoma was present, and at the place where it normally meets the articular eminence or transverse root (in other words, at the tubercle of the zygoma), the temporal was joined to the malar bone, the suture connecting them being distant only half an inch from the circumference of the external auditory canal, while on the opposite side the interval amounted to an inch and a half (*Figs. 12 and 13*). The glenoid cavity was absent, and in place of it was merely a flat quadrilateral surface, the inner portion of which alone was concerned in the motions of the jaw, and presented a shallow sulcus antero-posterior in direction. This sulcus formed a segment of a large circle, in which the curved and atrophied condyle moved. The non-articulating portion of the right temporal bone posterior to the Glasserian fissure was not deformed, but the entire bone was smaller than its fellow, had no groove for the lateral sinus, and the right jugular foramen was scarcely half the size of that on the opposite side. The malar bone was small, thin, and concave on its facial surface, but possessed a zygomatic process of extraordinary length, which formed the entire

PLATE IV.

Fig. 10. Unilateral congenital smallness of the lower jaw. Front view of the face. Case 2.

Fig. 11. Front view of the skull of the above.

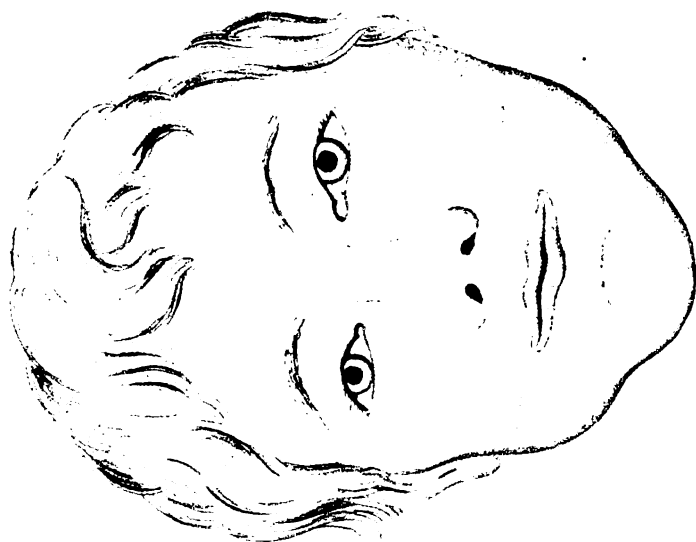


Fig. 13, after Smith.

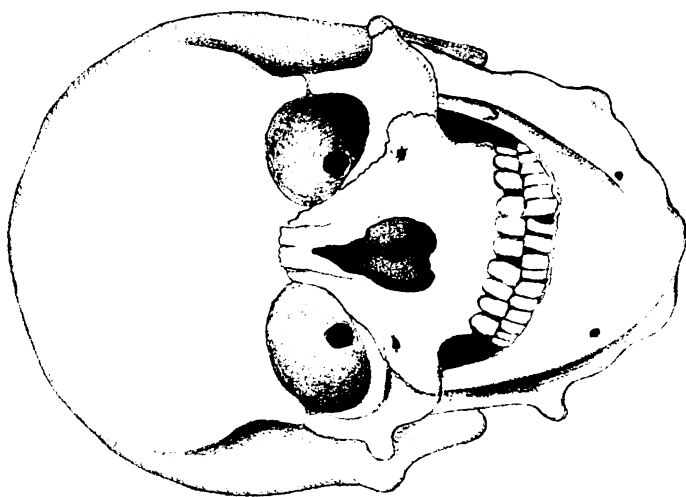


Fig. 11, after Smith.

zygomatic arch. The right zygomatic fossa was a quarter of an inch narrower than the left. The right superior maxilla was smaller than natural, its alveolar border did not descend so low as that of the opposite bone, and the suture by which it was united to its fellow did not occupy the mesial line, so that the palate did not consist of two symmetrical portions, but the suture was directed obliquely from before backwards, and from right to left (*Fig. 15*). The right half of the sphenoid bone, especially its greater wing, was smaller than the left, and the temporal and zygomatic fossæ were correspondingly diminished in size (*Fig. 15*). The right orbit was smaller than the left, and the right side of the brain was also smaller than the left. The motions of the lower jaw, especially lateral motion, were more extensive than normal, the right ramus being drawn backwards and forwards during their performance. During life the patient was observed to be constantly performing these motions, and the right side of his face was continually affected with spasmodic twitches.

Smith has classed this case among the congenital dislocations such as are found affecting the joints of the shoulder, wrist, and hip, and it has long been quoted as the only well-described case of congenital dislocation of the lower jaw which exists. But it has been doubted whether the name "Congenital Dislocation" rightly expresses its real nature; and considering how little we know of the causes of congenital luxations, or whether the displacement of the bones is the main feature of such, it must be admitted that the title has been badly chosen. In the so-called congenital luxations of the radius, for example, the bones of the forearm are found to present such deformities as could not have been the consequence of a luxation occurring early in foetal life, and a comprehensive view will inevitably lead to the conclusion that, in the present state of our knowledge, we are bound to concede that the displacement of the articulation is not the most important feature, but is indeed, not a cause, but a consequence of a more general cause. The same reasoning applies with even greater force to the lower jaw. In Smith's case, a luxation of the right temporo-maxillary

articulation at an early period of foetal life could not possibly have produced the existing asymmetry of the cranium and brain, and the atrophy of the facial bones of the right side. Smith's statements are so clear and distinct that there is no difficulty in summing up the case as unilateral arrested development of the head, having its culminating point in the right inferior maxilla, *which was atrophied equally from condyle to symphysis*, the whole being the result of some unknown cause.

It is, however, only fair to Professor Smith to state that, in spite of his classification of his case under the title of congenital luxation, he seems to have had a correct knowledge of its proper nature; for, after quoting the opinions enunciated by Ribes (in his Memoir on the Articulation of the Lower Jaw) concerning the formation of the glenoid cavity, which are briefly as follows, viz., that the growth, pressure, and movements of the condyle produce the glenoid cavity and articular eminence; and showing the bearings of these on his own case, Smith points out that there are many objections to the explanation of it by a supposed foetal displacement, and indicates his opinion that the deformity arose from congenital malformation, and was not the result of disease or accident. In other parts of the work from which the above case is copied, we find Smith holding equally broad and philosophical opinions concerning other so-called congenital luxations. In connection with that of the wrist joint and elsewhere, he speaks of "arrest of development" and "original malformation" as being the only possible means whereby such appearances can be produced, and adds * "I am wholly unprepared to offer any satisfactory explanation of the causes of original luxations; nor can any sufficient solution of the phenomena be arrived at, except by the examination of the foetus at the earliest periods of intra-uterine life."

* Smith, Op. Cit., p. 272.

PLATE V.

Fig. 12 Skull of the preceding plate, viewed from the right side.

Fig. 13. The same, viewed from the left side,



Fig. 12, after Smith.

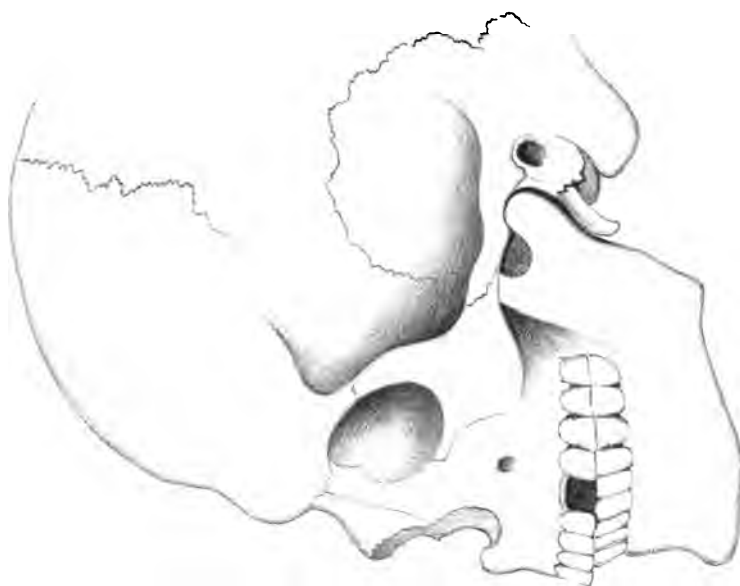


Fig. 13, after Smith.

Hence, I think I am justified, looking at the subject from the stand-point of a monograph on congenital malformations of the lower jaw, in removing the above-case of Smith's from under the heading of "Luxations" into that of "Arrested Development," and in quoting it as a case affecting one-half of the bone in question.

3. For an opportunity of studying this case, I am indebted to my friend, Mr De Lessert, dentist, Aberdeen:—

S— S—, an unmarried female, domestic servant and cook, aged 40, seen by me in June, 1873, was the subject of the following deformities. She was unwilling to be examined, and it was with difficulty that she was persuaded to allow the requisite measurements and observations to be made. This difficulty was however sufficiently overcome for the following data to be obtained and verified on more than one subsequent occasion. I believe the following statements regarding her to be perfectly accurate and reliable. She was of ordinary health and conformation, and her mental faculties were perfect. The deformity of her face existed from birth, according to the statements of her parents, and she herself remembers its being remarked in her before she had reached the period of her second dentition. Her hands and feet are perfect and symmetrical, and she is positive in her statement that nothing unusual exists anywhere about her otherwise than in the face.

On looking her straight in the face the most striking feature observable is a strongly marked inequality of the two sides of the face below the level of the eyes (*Fig. 16*). The left malar bone is in size only four-fifths of that of the right malar bone, and the left side of the face beneath it is so diminutive that the measurement from the angle of the left lower jaw to the lower border of the left zygoma (or, in other words, the length of the posterior border of the left ascending ramus) is one and a-half inches, as against two and a-half inches on the right side. There exists a hollow where the prominence of the condyle of the left lower jaw should be felt. The left coronoid process, as far as can be ascertained by the touch, is small, but in tolerably perfect

condition. The breadth of the left ascending ramus is one inch, that of the right is one and a-half inches. The left horizontal ramus is smaller than the right, its length being three inches, while the right ramus is four and three quarter inches. The perpendicular depth of the horizontal rami is one and a quarter inches on the left, and one and three quarter inches on the right side. The central line of the jaw at the lower incisor teeth (*Fig. 17 a*) deviates a quarter of an inch to the left, the deviation at the lower border of the symphysis being one inch to the left, so that the left half of the bone is smaller in proportion along its lower than its upper or dental margin.

The teeth of the left lower jaw are somewhat smaller than those of the right. On the left side there exist two incisors, one canine, and two bicuspid; the first molar has been extracted, but the stumps of the second molar and wisdom tooth are still present, their direction, however, being so much inwards that it is evident these teeth had never been opposed to those of the upper jaw. Her complement of teeth in the left lower jaw had therefore been complete. In the right lower jaw all the teeth are present and entire, except the second molar, which has been extracted; the gap left by it still remaining (*Fig. 18*). The length from the mesial line to the canine angle is nine-sixteenths of an inch on the right side; the length from the canine angle to the anterior border of the ascending ramus is an inch and five-eighths on the left side, and one and three-quarter inches on the right side. In fact, the left side is atrophied in all its segments, and proportionally in all.

When the jaws are closed, a gap, one-twentieth of an inch wide, exists between the upper and lower teeth of the left side, but those of the right side are in close contact. The left teeth, both upper and lower show no attrition

PLATE VI.

Fig. 14. Lower jaw of the skull, from the preceding plate, seen from below.

Fig. 15. Skull from the preceding plates, seen from below.

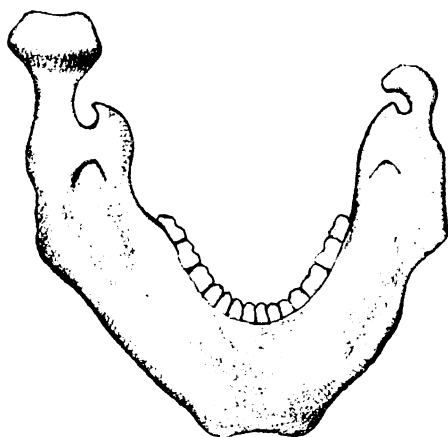


Fig. 14, after Smith.

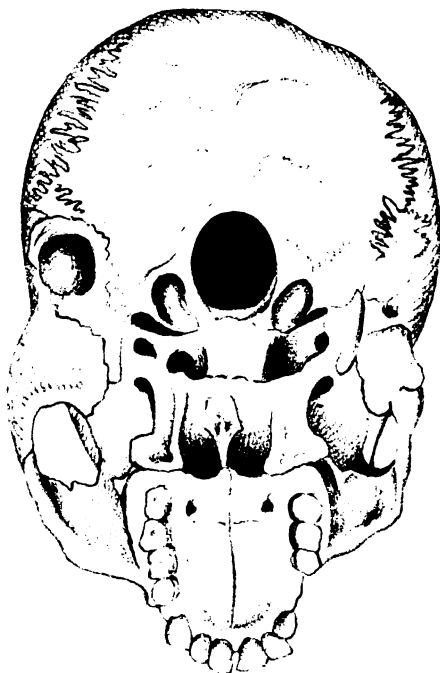


Fig. 15, after Smith.

facets where they should exist, but these are present, as usual, on the right side, both above and below.

The usual number of teeth have been present in both superior maxillæ; on the right side they are still perfect, excepting the first bicuspid, the stump of which remains; on the left side the canine has been extracted, the three molar teeth are represented by their stumps, and the other teeth are entire. But all the left upper teeth are smaller than those on the right side (*Fig. 17*). Nowhere, either in the upper or lower jaw, is there any undue crowding of the teeth.

The hard palate is more arched than usual, and the horizontal portions of the superior maxilla and palate bone are slightly smaller on the left side.

The soft palate is of a pale bluish purple colour, and well formed in both halves, though the left half is more flabby to the feel, and thicker in its perpendicular diameter (thickness) than the right half. The lower border of the left half hangs fully a quarter of an inch lower than the right, and by no mechanical irritation can any motion or elevation of the left half be caused, save that which it derives from the right half, the muscles of which react normally. The left levator and tensor palati are evidently absent, or rudimentary.

The tongue can be protruded without any deviation, but its bulk is less on the left than on the right side of the median raphe. The nose and eyes are quite symmetrical, although, from the smaller size of the left molar and superior maxillary bones, the measurement from the tip of the nose to the ear is four and three quarter inches on the left and five inches on the right side. The right ear is perfect, its perpendicular length being two and a half inches. The left ear (*Fig. 19*) is a mere elongated rudiment, formed apparently by the folding inwards of the imperfect pinna. Its length from above downwards is two inches, and its shape so irregular that it could hardly be described. I have therefore attempted, in *Fig. 19*, to convey an idea of its form. The left external auditory meatus is absent; its locality is indicated by one or two pits or fossæ of no depth, terminat-

ing in *culs-de-sac* immediately below the level of the skin. The left auditory region is sunk inwards, and much less developed than on the right side. The hearing of the right ear is perfect and the membrana tympani normal; the Eustachian tube can be inflated with ease in Valsalva's experiment. The tick of a watch is heard on being firmly pressed against the left ear; but when the watch is placed in contact with the teeth its sound is referred to the right ear and is increased when the meatus is closed with the finger.

The cranium is asymmetrical; although this is rendered less distinct, and satisfactory measurements are not attainable from her manner of dressing her hair. She obstinately refuses to undo her coiffure. The following points can nevertheless be clearly made out:—The left side of her cranium is somewhat smaller than the right, both in its horizontal and perpendicular measurements, a fact of which examination on three several days leaves no doubt. Horizontal measurements are not attainable, but from a point over the anterior end of the sagittal suture to the lower border of the zygoma, the measurement on the left side is five and a half inches, on the right side six inches. Another measurement from a point over the front of the sagittal suture to the angle of the lower jaw gives nine inches on the left and eleven inches on the right side.

The preceding observations, carefully made and noted down at the first visit, seemed to indicate the probable absence or rudimentary condition of the petrous portion of the left temporal bone; hence the condition of the facial and trifacial nerves, so far as these could be inferred from external examination, was next investigated with care.

PLATE VII.

Fig. 16. Unilateral congenital smallness of the lower jaw. Front view of the face. Case 3.

Fig. 17. Teeth of the same seen from the front. *a.* Space between the right and left central incisors in the lower jaw. *b.* Space between the central incisors of the upper jaws (from plaster cast).

Fig. 18. Lower jaw of the same seen from above (from plaster cast).

Fig. 19. Left ear of the same (from plaster cast).



Fig. 16.

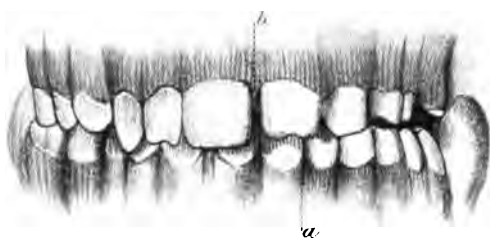


Fig. 17.



Fig. 19.



Fig. 18. Digitized by Google

The left eyelids could not be so firmly closed as the right, and she could distort the mouth to both sides, but not "screw up" its left corner (zygomatici). Beyond these, no evidence of deficient action of the left facial nerve could be elicited.

Sensation of the left side of the face was perfect. The left temporal and masseter muscles were small and their contractions feeble compared to the corresponding muscles on the other side. The action of grinding the teeth was well carried out, the right side of the jaw and its muscles being principally though not entirely concerned in its production. She could protrude the lower jaw with ease, but only to a limited extent, the range of motion in this direction being less than a quarter of an inch, and being mainly, though not entirely, effected by the right side and its muscles.

IV.—CONGENITAL DISLOCATION OF THE LOWER JAW.

Having attempted to show, under Case 2, that Smith's observation cannot be fairly placed under the head of a dislocation, it only remains for me to remark that the congenital dislocation of the lower jaw rests on the insecure basis of a single imperfectly recorded case.

Guérin has adduced this solitary example, and recorded it in the "Gazette Medicale de Paris," 1841, Nos. 7 and 10, and in his "Recherches sur les Luxations Congénitales," Paris, 1841. I have been unable to obtain these numbers of the "Gazette Medicale," which are said * to contain a mere mention of the case without closer description. Smith† gives the following quotation from the second source, and it seems to embrace all which has been recorded:—"Complete dislocation of the lower jaw into the zygomatic fossæ. This I have observed in an anencephalous foetus" (abortion‡) "which is here; the tension and shortening of the muscles depressing the jaw and of the external pterygoids are in contrast with

* Gurlt, Beiträge zur vergl. pathol. Anatomie der Gelenkskrankheiten, Berlin, 1853.

† Smith, Op. Cit., p. 273.

‡ Gurlt, Op. Cit. p. 121.

the elongation and diminished bulk of the temporals and masseters."

To enable a reliable opinion, therefore, to be formed as to the existence or non-existence of congenital luxation of the lower jaw, fuller details of Guérin's case, or fresh observations, are much to be desired.

CONCLUSION.

Having now given as complete a resumé as lies in my power of the various congenital malformations to which the lower jaw is subject, and interpolated, where it seemed necessary, explanations sufficient, I hope, to have rendered clear the views of these which we seem justified in adopting, it only remains for me to embody in a series of propositions the conclusions we seem warranted in drawing from our present knowledge of these deformities. These are as follows:—

1. Congenital deformities of the lower jaw are very rare.
2. Non-development of the lower jaw has been recorded in animals, but never in man.
3. Excessive development of the lower jaw appears to occur, though very rarely, and minutely recorded cases of it do not exist.
4. Preponderance of size of the lower jaw has been observed as the result of deficient development of some of the other facial bones.
5. Congenital smallness of the whole lower jaw occurs, and is generally associated with symmetrical deformities elsewhere.
6. Congenital smallness of the whole lower jaw may lead in after life to acquired deformities of the bones of the cranium and face.
7. Congenital unilateral smallness of the lower jaw has been found in one case with, and in two without, formation of the temporo-maxillary articulation of the same side, and coincided in all with asymmetry of the cranium.
8. Congenital dislocation of the lower jaw is said to have been met with in a single imperfectly recorded case.

II.—NOTES OF FIVE CASES OF COMPOUND DISLOCATION OF, AND COMPOUND FRACTURE INTO THE ANKLE JOINT.

By ALEX. PATTERSON, M.D., *Surgeon to the Royal Infirmary Dispensary.*

(*Read before the Medico-Chirurgical Society, 1st May, 1874.*)

SIR ASTLEY COOPER, in his description of compound dislocation of the ankle joint, gives the following as the constitutional symptoms attendant on the injury:—"In two or three days from the accident, or sometimes as early as twenty-four hours, the patient complains of pain in his back and in his head, showing the influence of the accident on the brain and spinal marrow. The tongue is furred; white, if the irritation be slight; yellow, if greater; and brown, almost to blackness, if it be considerable; the stomach is disordered; there is loss of appetite, nausea, and sometimes vomiting; secretion ceases in the intestines and in the glands connected with them, as the liver, etc.; costiveness is therefore an attendant symptom.* The skin has its secretion stopped; it becomes hot and dry: the kidneys also have their secretions diminished; the urine is high coloured and small in quantity. The heart beats more quickly, and the pulse becomes *hard*, which is the pulse of constitutional irritation from local inflammation, and in great degrees of this excitement it becomes irregular and intermittent; the respiration is quicker, in sympathy with the quicker circulation; the nervous system becomes additionally affected, in high degrees of local irritation; restlessness, watchfulness, and delirium, subsultus tendinum, and sometimes tetanus occur."

Mr Syme states, that at one time, on looking into the records of the Infirmary in Edinburgh, he found that the last fourteen cases of compound dislocation of the ankle admitted, had all ended fatally. He therefore came to regard amputation at the ankle as the best treatment in most cases;† though he sometimes modified his practice so far as to content himself with removing the end of the tibia, so converting the case into one of excision of the ankle.

Mr Erichsen says of compound fractures of this joint, "Com-

* Sir A. Cooper, on Dislocations and Fractures. London, 1826, p. 240.

† Lister, 1870. Case of Compound Dislocation of Ankle Joint.

pound fractures of the ankle joint are very serious injuries, commonly requiring amputation, if associated with dislocation and extensive wound of the soft parts."

Gentlemen, I have quoted those eminent authorities to show the extremely dangerous nature of the injuries, and shall now, with your leave, read notes of five consecutive cases, all of which were treated antiseptically in the Royal Infirmary.

CASE I.—A. C., aged 14, apprentice engineer, a delicate scrofulous lad, admitted to hospital on 7th May, 1872.

This morning, about an hour before admission, patient's right foot was caught in some machinery and twisted. The tibia and fibula are seen protruding through the skin, with the foot turned inwards, at right angles with the limb. The ends of the bones are covered with coal dust, which has been apparently ground into the cartilage, so that it cannot be removed by washing; a consultation was held, at which it was determined that an attempt should be made so save the limb, by removing the ends of the tibia and fibula—which was done—the wound put up antiseptically, and placed comfortably in a Macintyre splint.

6 P.M.—Patient has kept very well all day; but to-night he complains of sickness, and has vomited once or twice.

11 P.M.—One grain of opium administered.

May 8th.—Slept well all night; took a little breakfast; bowels opened.

Evening.—Patient vomited again to-night. Pulse 100; of good volume.

May 9th.—At to-day's dressing, fluctuation, to a limited extent, was discovered on the anterior surface of leg, where an opening was made—under the carbolic spray—giving vent to a small quantity of pus.

May 11th.—Doing well. Sleep and appetite good. The patient was ordered to take quinine and iron.

This case continued to progress satisfactorily, and was dressed as required.

June 29th.—Side splints to replace the Macintyre.

Dismissed well on 27th August, 1872.

CASE II.—D. M., aged 22 years, admitted on Friday the

20th September, 1872. To-day, whilst at work in a ship-yard, a log of wood fell on his left leg, causing a compound dislocation of the ankle joint. Both bones of the leg protruded outwards—the internal maleolus broken off, and remaining attached to the internal lateral ligament, the foot having its sole turned towards the opposite limb. The very intelligent house surgeon carefully but slightly enlarged the skin wound, flexed the thigh on the pelvis, and the leg on the thigh, and easily returned the bones and foot into proper position. The strongest watery solution of carbolic acid (1 to 20) was thrown into the joint plentifully; the foot and half-way up the leg carefully dressed with eight-fold gauze, next the wound, and the splint applied. Next day the dressing was changed under carbolic acid spray, when a large clot was found filling the ragged wound, and from which a considerable quantity of bloody serum had escaped. The protective green silk was now applied next the wound (it is not necessary at the first dressing in such a case, or in any case where a profuse discharge may reasonably be expected), gauze was placed over it as before, the limb neatly bandaged with a Scultetus, and placed in a well-padded Macintyre splint. The wound was dressed every third, fourth, or fifth day, as we deemed necessary from the apparent amount of discharge. This man gained, we calculated, more than a stone in weight during his residence in hospital, which he left with a joint perfect in shape and motion.

CASE III.—June 23, 1873.—T. M., labourer, aged 34, whilst at work on a scaffold, fell from a height of 19 feet, alighting on his feet, in the midst of a heap of stones. He is found to have sustained a compound comminuted fracture of both bones of right leg, near the ankle—communicating with the joint—while the external wound is about two inches in length along the fibular side of the limb. In addition to injuries of right leg, there is also simple fracture of both bones of left leg in the same situation. Both feet are twisted to the left. The right leg was dressed antiseptically, the left being put up in straight side splints.

June 24th.—Dressed wound. Doing well. Pulse 84.

June 26th.—Dressed. Pulse 76.

July 18th.—Wound nearly completely healed.

If I remember correctly, this man's wound was dressed only eight times in all, and he left the Infirmary on the 25th August, well.

There was no constitutional disturbance whatever from first to last.

CASE IV.—Admitted August 20th, 1873.—T. S., aged 27 years, railway guard. Patient states that whilst engaged in uncoupling two heavily laden waggons (each of which weighs six tons), they suddenly separated, causing him to fall between the lines; one of his legs, however, being thrown across the rail, was severely crushed about the ankle, by one wheel passing over it. On admission at four a.m., patient was suffering very much from shock and loss of blood. Although a tourniquet was on the limb, blood was oozing freely from the wound, and his friends stated that it had bled freely since the accident, three-quarters of an hour previously. On examination, he was found to have sustained a compound comminuted fracture of tibia and fibula, opening into the ankle joint, with several spiculæ of bone lying loose. The wound was situated over the lower end of the tibia, and to the inner side, while the foot and leg were bruised, and very much swollen, even at this early period. You will easily understand, gentlemen, the appearance which a joint would present, after the wheel of a railway waggon, weighing six tons, had passed over it.

Treatment.—The joint was thoroughly syringed out with a lotion of carbolic acid, 1 to 20, and put up antiseptically in a Macintyre splint, and, on account of the shock, stimulants were freely administered. At the visit-hour, 9 A.M., I asked the valued counsel of a senior member of the staff—the only one in the house at the time—and he at once said, after having introduced his finger into the joint, and carefully examined the patient, “Either life or limb; there is no chance there.” This was my own opinion, but the man was averse to any operation, and I promised to do what could be done for him, at the same time explaining the

additional risk incurred in case of failure. The wound was again very carefully washed out with the antiseptic lotion, dressed with eight-fold gauze, covering the entire foot and limb almost to the knee-joint.

August 21st.—Patient passed a fair night with the aid of 40 minims of solution of morphia; limb dressed; foot very much swollen, leg also to a considerable extent; pulse good; bowels costive; laxative ordered.

11 P.M.—Bowels have been freely opened; tongue clean; appetite fair.

August 22.—Counter openings made under spray in leg and foot. Appetite and pulse good.

August 24.—Limb much improved by the openings. Patient slept well, and ate a hearty breakfast.

August 26.—Dressed; looking well. General condition very satisfactory.

September 4.—At the dressing to-day a small abscess was found on the inner aspect of limb, which was freely incised, under the carbolic spray.

September 6th.—Discharge very slight in quantity.

September 10th.—Leg put up in short side splints.

September 17th.—Dressed. Looking very well.

September 24th.—Dressed. Healing very rapidly. General health excellent. Early in November the limb was put up in poroplastic splints, changing once a-week. The case progressed most satisfactorily, and the man left the house on the 2nd December. After the first day this patient had not an ounce of stimulant, and nothing in the shape of diet, except the ordinary house fare.

CASE V.—J. M'G., aged 40, miner, admitted on 9th September, 1873. This morning, whilst patient was at work in a coal pit, a large quantity of earth suddenly gave way, falling upon him when in a bent position. On admission, the bones of the leg, with the astragalus fractured and hanging to them, were found protruding from a lacerated wound four inches in length, on the inner aspect of the leg. Patient having been put under the influence of chloroform, I carefully examined the injured parts, and finding the

astragalus broken and completely torn away from its connection with the os calcis, removed it. The internal maleolus was also found to be fractured. A thin slice was sawn off the ends of the tibia and fibula, a small vessel ligatured with catgut carbolised, and the whole put up antiseptically.

Judging it prudent, from the man's haggard and anæmic appearance, he was ordered quinine and iron.

September 10th.—Dressed to-day. Wound looking very well. Patient is restless and extremely irritable, probably due to the fact of his indulgence in stimulants. To have chloral.

September 11th.—Less disturbed to-day, but complains of great pain in the foot.

14th.—Considerable pain, swelling, and redness up the leg.

18th.—A large slough has formed on the dorsum of the foot, and a smaller one over the site of either maleolus. Does not sleep soundly. To have morphia every night.

20th.—Sloughs now separated.

28th.—Looking very well.

Oct. 1.—Some redness up leg. Appetite and pulse very fair.

Oct. 9.—Pulse 100. Slight undermining up outer side of limb. Opening made antiseptically, and discharged some healthy pus.

Oct. 13.—Two small bed sores the size of a shilling having formed over the sacrum, we determined to put the leg up in pasteboard splints to enable patient to turn on either side. This was done, and with great relief to the poor fellow. The sores on his back healed within a week, and from this time forward he began to add to his weight. He was dismissed on the 19th January, 1874.

Regarding compound injury of the ankle joint as one of the most serious accidents to which the frame is liable, it appeared to me to be a sort of crucial case for trying the efficacy of the antiseptic treatment, and the result in the five cases just read shows how well it stands the test.

In cases fourth and fifth, a stiff ankle joint may be expected. However, in course of time, preternatural mobility will ensue in the anterior tarsal joints, which may, to a certain extent, compensate for the immobility at the ankle.

III.—ON THE ABSORPTION OF DEAD BONE.

By DR JOSEPH COATS, *Lecturer on Pathology in Glasgow University, &c.*

THE question of the absorption of dead bone is one of considerable practical importance, and one on which the views of authors do not as yet seem perfectly united. Formerly it used to be supposed that pus has some corroding influence on dead bone which is macerated for a long time in it, and this corroding power was supposed to depend probably on the chemical characters of the pus. It has, however, been shown that portions of dead bone may remain for very long periods bathed in pus without any destruction taking place. Cornil and Renvier figure a transverse section of a sequestrum of the humerus, which had remained for thirty years in the midst of pus.* The inspection of this section shows that the bone has undergone no corrosion during this long sojourn in the body; it has exactly the appearance of an ordinary section of macerated bone. Again, Holmes, in the article on "Diseases of the Bones," in his "System of Surgery," refers to a preparation in the museum of St Bartholomew's Hospital, consisting of the shaft of a femur exhibiting in its interior a sequestrum, which had probably been there for thirty-five years, and yet was unaltered. Then Gulliver long ago performed some experiments, which are still quoted to show that dead bone is not absorbed or altered by the living tissues.†

On the other hand, apparent evidences of a partial or complete absorption of portions of dead bone have been frequently brought forward. Portions of sequestra, examined under the microscope, were found sometimes to present at their margins an eaten-out appearance. In many cases, certainly, as in that of Cornil and Renvier, mentioned above, there has been no such appearance; but in others there has been observed a condition of the margins of the sequestrum strongly suggestive of a process of erosion (see Figs. 1 and 2). On the other hand, appearances of this kind may be misleading. In most cases of necrosis the portion of bone which is killed will have a

* Cornil et Renvier. *Manuel d'Histologie Pathologique, Deuxième Part'e*, Paris, 1878. p. 358.

† Gulliver. *Med. Chir. Trans.* Vol. xxi.

very irregular margin. Except in traumatic cases, one would expect the exact limits of the necrosis to be determined to a certain extent by accidental circumstances. For instance, in a superficial necrosis, due to periostitis, the thickness of the portion which is unable to survive will be determined by a variety of circumstances, and its boundaries will be correspondingly irregular. Hence, as Rokitansky has pointed out, the fact that the margins of the sequestrum have an eroded appearance, is no evidence of an actual process of absorption; it is more probably due to the inequality of the extent of the original necrosis.* In estimating the evidences of absorption from the appearances of the margins, this consideration must therefore be taken into account. But there are other evidences of the existence of an actual absorption of dead bone, besides that derived from the appearances of the margins. It is well known that ivory pegs used in the treatment of ununited fracture may undergo partial absorption, their extremities are rounded, and the margins present, under the microscope, the same eaten-out appearance as true sequestra. Again, there seems little doubt that in simple fractures pieces of bone are often completely separated, chipped off; and as these are not discharged at any subsequent period, it seems probable that they are often absorbed. Lastly, a process of absorption of dead bone has been actually observed in certain cases of compound fracture, treated by Lister and others, on his antiseptic principle. Considerable portions of exposed and dead bone have been seen to become covered by granulations, and gradually eaten up or destroyed.

It seems, then, that though dead portions of bone may withstand, for the better part of a lifetime, the maceration of pus, still there are circumstances in which an actual absorption or destruction may take place. It being proved abundantly by experiment that pus is unable to destroy or erode dead bone, it was natural to turn to the granulations for an explanation of the process. Volkmann accordingly writes as follows:—“Dead bone may be gradually destroyed and absorbed by growing granulations which press against it. This fact, though

* Rokitansky. *Lehrbuch der Path. Anat.*, 1856. Vol. ii., p. 125.

long disputed, is now placed beyond doubt."* And in Lister's cases the granulations seemed to bear the principal part.

These remarks have been occasioned by the occurrence of a case, in which I have found what appear to me to be distinct evidences of a partial absorption of a sequestrum, and in which also certain histological points of considerable interest have been observed.

The case was one of a limited necrosis of the femur at the end of a stump, occurring in a boy 16 years of age. He was admitted under Dr Patterson, at the Royal Infirmary, with a very severe lacerated wound of the leg, followed in a day or two by gangrene. Amputation was performed through the middle of the femur, and in a few days both flaps became partially gangrenous, so that the bone was left projecting. The boy was at first very much exhausted, but ultimately did well. It was found that a portion of the bone at the end of the stump had died, and about two months after the first operation the stump was opened up, and as the bone projected beyond the flaps, about two inches were sawn off, including the sequestrum, which by this time had become loose. The stump afterwards healed kindly, and the boy made a good recovery. After dividing the portion of bone longitudinally into four pieces, it was placed in a solution of chromic acid with a few drops of hydrochloric acid, till the lime salts had been sufficiently extracted to allow of sections being made with the razor. The sequestrum was found to be quite loose, and, except at its extreme lower part, completely embedded in granulations. It involved about half the circumference, and—in its middle portion at least—the entire thickness of the shaft. At its extreme lower part, the sequestrum was bare, and here the original saw-cut was unaltered. The surface was also bare for about a third of an inch above the extremity, but elsewhere a thick layer of granulations covered the dead bone. Outside the granulations was a layer of living, newly-formed bone. Under the microscope this new bone presented no regularity of formation, being composed of trabeculæ running mostly from within outwards, and not in the least resembling the longitudinal trabeculæ of the shaft of the femur. It was

* Volkmann, in Pitha and Billroth's *Handbuch der Chirurgie*. Bd. ii., p. 239.

evident, therefore, that the periosteum had become separated from the necrosed bone, and between them a rich layer of granulations had sprung up, while the periosteum in the usual way had been forming a new bony case. The sequestrum was longer than the portion of bone removed; it occupied its entire length, and was cut across by the saw at its upper end, so that a portion had been left in the stump. At its lower extremity, as already mentioned, the dead bone was unaltered and bare; but wherever it was covered by granulations it presented a remarkably worm-eaten appearance. In passing from the bare to the covered portion, there was quite a sudden dip, and everywhere else both the internal and external surface presented a highly corroded appearance, and even several apertures were present in its upper part. Thin sections of the sequestrum, both longitudinal and transverse, were made, and the results obtained are now to be described.



FIG. I.

Transverse section of necrosed bone, showing widening of Haversian canals and irregularity of margins. Magnified 40 diameters.

In Figure 1 are exhibited the appearances observed when a transverse section was examined with a low power. It will be seen that the lacunæ present their usual arrangement. The margins of the bone have the eroded appearance already more than once referred to. As mentioned above, the meaning

of this eroded appearance of the margins is somewhat ambiguous: it may depend on the original irregularity of the limits of the sequestrum. But this section exhibits peculiarities which are not open to this objection. The eaten-out appearance is visible not only at the margins of the section, but there are cavities in the midst of it whose margins have the same characters. These, which appear on transverse section as empty spaces, are in longitudinal section elongated canals: they are undoubtedly the altered Haversian canals. And when it is considered that we have here to do with the dense bone forming the shaft of long bone, it must be evident to any one who has ever seen a section taken from such a situation that the Haversian canals are very much widened, and that the sequestrum has undergone a partial erosion from within. It appears, therefore, that the process, whatever it may have been, has not confined itself to the margins of the sequestrum, but has been going forward wherever a canal in the bone has allowed a starting point. It is to be noted, however, that the erosion has not taken place in every Haversian canal; there are one or two in the section figured which retain their normal dimensions. We can readily suppose that these particular canals may, at the part which the section has hit upon, be far removed from the surface, and that the process has not yet extended into them. We know that the Haversian canals extend to a considerable length longitudinally, and it is possible that these may have had a long course to this point. The important fact, however, is that the canals, in the majority of cases, are very much widened, and their margins eroded in a remarkable manner. The section contrasts in this respect with that figured in Cornil and Renvier's manual. In this connection it may be worthy of remark that the portion of the sequestrum which was most exposed to the action of pus is exactly the part which is not eroded. It has been already noted that at its inferior extremity and for a third of an inch above it, the external surface presents just the appearance of macerated bone. This portion of the necrosed bone projected in the wound, and would be continually bathed with pus, but it is when we pass up beyond the open wound, and among the granulations, that we find the evidences of erosion,

It has also been noted that the unaltered portion of the sequestrum was uncovered by the granulations; every other part was. Whenever we pass from the exposed to the covered part, there was a quite sudden dip, the sequestrum becoming thinner and eroded at once. The appearances of erosion were perhaps even more evident in longitudinal sections of the sequestrum. In these one could trace the widened canals for considerable distances, and observe the extreme irregularity of the margins. In referring to this appearance, I have all along spoken of it as giving the impression of erosion or eating-out, and these expressions very correctly convey the actual appearance. The margins are in the form of bays projecting into the bony tissue, and the bays, though varying in extent within certain limits, are still wonderfully uniform in breadth. The uniformity in size is indeed so great as to suggest that some special agent has been at work in their production, and that the peculiarity of outline is not merely an accidental occurrence. This peculiar condition of the margin has been frequently observed, and the bays now generally go under the name of Howship's lacunæ.

An objection suggests itself here to the assumption that even this widening and erosion of the Haversian canals is evidence of the absorption of dead bone. It may be asked, Has this erosion not taken place before the death of the bone? Has the bone not been first altered and then killed. Now it must be acknowledged that a widening of the canals and medullary spaces—a rarefaction of the bone—is the usual result of inflammation of dense bony tissue. The results produced by certain forms of inflammation are very much like those exhibited in the present case; the canals are widened and their margins present similar Howship's lacunæ. But apart from the evidences of absorption which are still to be brought forward, there are even here certain considerations, which render this objection of less weight than might at first appear. Note in the first place the fact that all the covered parts of the bone are eroded, the uncovered are not. That is to say, wherever the sequestrum is in contact with granulations it is eroded, but whenever it is not so covered it is unaltered. The end of the bone which projects beyond the granulations is smooth on the external surface,

though the internal surface which is in contact with granulations is eroded. Then if we consider the history of the case, it seems evident that the death of the bone must have been an early phenomenon. The entire duration of the case was only about two months, and it is most probable that the necrosis of the bone occurred at the same time as the gangrene of the soft parts, namely, soon after the infliction of the injury. Besides this, it has already been remarked that the necrosis originally involved the entire thickness of the shaft, whereas we have here a thin corroded shell with apertures in some parts. Taking these considerations into account then, we can ascribe the erosion of the sequestrum only to a process going on after its death.

If we turn now to the question of the actual process by which the absorption takes place, this case presents some points of interest, and though there are certain matters left unexplained, still it may be taken as to a certain extent advancing our knowledge in the direction indicated.

The fact has been frequently noted already that the margins of the sequestrum present numerous and pretty regular bays or lacunæ; now it appears on careful examination that these bays are for the most part occupied by large cells. (See Fig. 2.) The cells present the characters of those originally described by Robin, and called by him "*Plaques à noyaux multiples*," and afterwards "*myeloplaques*." They are called "*myeloid cells*" by Paget, but are now more commonly named "*giant cells*." Lastly, Kölliker has recently designated them "*ostoclasts*," or "*bone-destroyers*"; and the reason of this name will appear afterwards. These cells, which are depicted in Fig. 2, exceed very much in size the ordinary granulation cells, so much as to warrant the name giant-cell being applied to them. They are composed of a granular protoplasm in which are imbedded numerous nuclei—hence Robin's name "*plaques à noyaux multiples*." The cells have an irregular outline, and many of them possess numerous diverging processes. They fill for the most part the bays in the bone-tissue, exactly corresponding with them in size; in some cases are almost enclosed in a cavity of the bone. (See the specimen

to the left in Fig. 2.) They are present in very large numbers all round the sequestrum, and also in the widened Haversian canals. In thick sections they are always to be found in their places in the cavities, and are then seen to be very abundant; in thinner sections they have to some extent dropped out, leaving the bay empty, and are sometimes to be found floating free around the preparation. (See Fig. 2.) As may be seen from the specimens figured, the cells present considerable varieties in size, shape, number of nuclei, and even in the size of the nuclei, but in these respects they do not differ from cells of a similar nature hitherto observed. In specimens preserved in chromic acid, they are always very readily detected by the brownish colour which they take on, as well as by their large size.

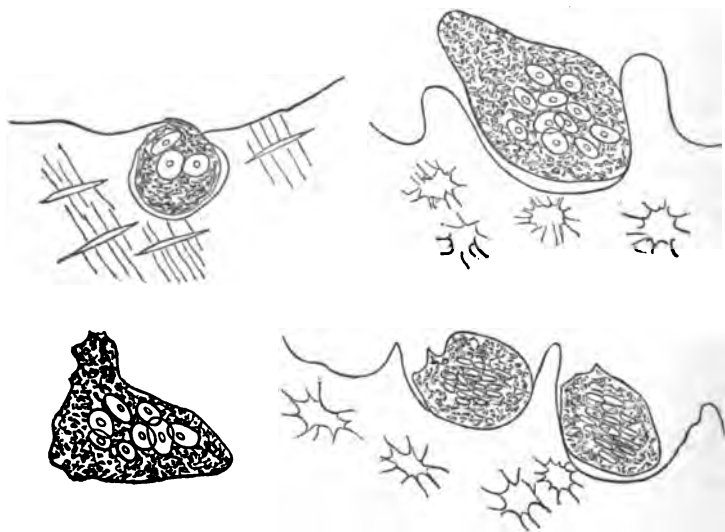


FIG. II.

Giant-cells, some of them in bays or Howship's lacunæ; one free. Magnified 350 diameters.

Considerable importance has been attached of late to cells of this nature in connection with the absorption of bone. Kölliker first pointed out their significance in this respect in a paper read before the Würzburg Society in 1872. He showed

that they occur uniformly in all parts of the normal skeleton where absorption of bone is going on. They lie in the Howship's lacunæ at the borders of the bone, and the cavities and cells correspond in size. In the period of growth of the skeleton, therefore, wherever the exigencies of the development of the bone require the absorption of certain layers of the already formed bone, there are to be found the giant-cells, evidently engaged in this process of destruction. It was from this fact that Kölliker gave them the name of osteoclasts or bone-destroyers. About the same time Wegner * came independently to similar conclusions as Kölliker, confirming the normal occurrence of these in connection with the physiological absorption of bone. In January, 1873, the same author published a paper in which the observation is carried from normal to pathological absorption. † He found them in cases of tumours of the brain and its membranes, with hydrocephalus, where there was erosion of the internal table of the skull, as well as in other cases in which absorption of bone was going on from the pressure of tumours or other structures. Still more recently, Rustizky has published a paper detailing the results of a number of pathological observations and experiments. ‡ He has found such cells in almost all cases of absorption of bone, though they were absent in a few. He looks on these giant-cells as active wander-cells, and found in his experiments that where vermilion is supplied to a living part where they exist, they take up the granules into their substance.

From these remarks it appears that wherever in the body the absorption of portions of bone is required, there we have the myeloplaxen or giant-cells concerned in the operation. Hitherto the observations have been confined to the absorption of living bone, but the facts recorded in the present paper seem to prove that a similar process is concerned in the absorption of dead bone. When, as in this case, a sequestrum or necrosed piece of bone undergoes absorption, then we have similar agents at work

* Berliner Klinische Wochenschrift, 1872. No. 21.

† Wegner. Myeloplaxen und Knochenresorption. Virchow's Archiv, lvi., p. 523.

‡ Rustizky. Untersuchungen über Knochenresorption und Riesenzellen. Virchow's Archiv, lix., p. 202.

to these which effect the same end, when, for instance, the clavicle is eroded before a growing aneurism or tumour. In both cases it seems to me that we must look on the bone to be absorbed as passive, the giant-cells being indeed active destroyers. In the present case they seem to be vigorously pursuing their calling, and we must conclude that their destruction of the bone here, is not the result of any alteration in its nutrition which they bring about, but the direct result of their own action. In a living bone we could imagine that a giant-cell seizing on its margins might so affect the nutrition of the part as to lead to an alteration in the bone-corpuscle nearest it, and that by the alteration thus induced in the bone-corpuscle, the melting down of the bone-tissue might be produced, the gap in the tissue corresponding to a bone-corpuscle and its territory. But in the case of dead bone this cannot be, and presumably the process is similar in the living. The cells referred to therefore warrant the name of osteoclasts given to them by Kölliker, though it is doubtful whether, considering that they have already so many names, a new one is needed. They seem to seize on the margins of the bone, and melting it down before them, gradually bury themselves in the cavity which they themselves have made. In this respect this observation confirms the conclusions come to by Kölliker, who considers that in physiological absorption, the bone-tissue is passive, but is actually eaten into by his osteoclasts.

The modes in which the giant-cells produce this erosion of the bone is a subject of great difficulty; it is as difficult to decide this point as to determine how certain other cells have to do with the formation of bone. It may be however of some significance in this direction, that as Rustizky has pointed out, these are active, contractile, amœboid cells. We know that such active cells have the power of taking up into themselves solid bodies, that they are in some measure independent individuals, and it is possible that as the simply-constructed fungus is able to penetrate into various animal tissues, and even into such firm structures as the hairs, so these active cells may be able to send processes into the bone and gradually enclose and corrode portions of it. My observations confirm

those of Kölliker, that the bone-tissue disappears before these cells as a whole. There is no solution first of the lime salts and then of the basis-substance, nor is there any breaking down of the tissue into granules; it seems to disappear in its entirety before the giant-cell.

As to the origin of these cells, there is not much in the case, so far as observed, to throw light on this point. It seems probable that the giant-cells have wandered on to the surface of the dead bone, so that they are now found at some distance from their original place. They have certainly not originated from the bone-corpuscles of the part undergoing absorption, but whether from those of neighbouring living bone, it is impossible to say. In certain parts of the living bone of the shaft there were evident changes in the bone-corpuscles, enlargement and other alterations, but the exact description of the appearances is beyond the scope of the present paper.

IV.—CASES ILLUSTRATIVE OF THE USE OF THE PNEUMATIC ASPIRATOR.

(Under the care of DR M'CALL ANDERSON.)

I. *Case of Hydro-thorax*.—T. S., aged 28, married, a ship carpenter, was admitted into the Royal Infirmary, 20th May, 1873, complaining of shortness of breath.

His family history was satisfactory, his diet had always been good, and he had been uniformly temperate in his habits. In December, 1870, he sustained a bruise of the right side, over the lower ribs, by falling from a height of 16 feet, and had never been free from cough since that time. In May, 1871, he had typhus fever; and in July two attacks of hæmoptysis, in the first of which he spat about half a pint, and in the second about an ounce of blood.

In August, 1871, whilst on a voyage to Sydney, he was suddenly seized with pain of a "sharp stabbing" character in the lower part of the right side of the chest, which was accompanied by shortness of breath. About four weeks thereafter he was able to resume work, and shortly after this, whilst running along the deck one day, he heard a "splashing" sound, referable to

the right side of the chest, a symptom which recurred for a period of four months, whenever he made any sudden or jerking movement of his body. Ever since the recurrence of the pain, his breathing has been rapid, and he has been unable to lie upon his left side, on account of dyspnœa.

On admission, his general state was satisfactory, the tongue was moist and clean, the appetite fair, the bowels regular, and the temperature 98.3. The pulse was 92, and the respirations 28. On examination of the chest, distinct fulness of the lower part of the right side was discovered (the circumference was $19\frac{1}{2}$ as compared with $18\frac{1}{2}$ inches on the other side), along with marked dulness upon percussion, involving the whole of the right side, especially towards the base, and extending an inch and a half to the left of mid-sternum. The heart was displaced to the left, the apex being situated two inches below, and three inches to the left of the left nipple. The liver also was displaced downwards. Over the whole of the right chest the vocal fremitus and resonance were diminished, while the respiratory murmur was extremely faint, and at the base posteriorly scarcely audible.

On the 24th of May, paracentesis thoracis was performed, the needle being introduced in the seventh right intercostal space, and $4\frac{1}{2}$ inches to the right of the spine. On this occasion only a small quantity of the fluid was withdrawn, about $9\frac{1}{2}$ ounces, which was found to be yellowish, almost whey-coloured, and opaque.

Although the amount of fluid removed was purposely small, it gave great relief to the breathing, and by the 27th the respirations had fallen to 18 per minute, and patient stated that he felt "the pulse of his heart nearer the middle line."

On the 28th the operation was repeated, the needle being introduced at the same point. The operation lasted an hour and a-half, and 139 ounces of fluid were removed. Towards the close the pulse rose to a hundred, and a fit of coughing came on, accompanied by expectoration, which was slightly streaked with blood.

The following note was taken $9\frac{1}{2}$ hours after the operation: "Patient feels much relieved in his breathing, and

can now lie with much greater ease than before upon his left side; he can also turn himself more freely in bed. pulse, 88; respirations, 16; temperature, 99·2; tongue moist and clean; bowels regular."

On the 3rd June, the following note was taken: "Can now lie with comfort in any posture. The measurement of the chest is the same on each side, 18·5 inches; the apex beat is situated an inch and a-half below, and in a line with the left nipple. The dulness on percussion anteriorly does not now extend beyond the middle line, and the respiratory murmur over the right front is rather more distinct.

On the 9th of July the operation was repeated in the same situation, and in an hour 83 ounces of fluid were withdrawn. Towards the close complaint was made of a sharp pain over the front of the chest.

On the 13th July, the following report was taken:—"Since the last note the pulse and temperature have been keeping rather high, 104 and 100·2 respectively, while the respirations are 24 per minute. Auscultation reveals a loud friction murmur over the whole of the right front, and patient states that when he takes a deep breath, he hears a rattling in the same situation."

These symptoms soon subsided, and accordingly on the 22nd of July 43 ounces of fluid were drawn off. The operation lasted three-quarters of an hour, and was stopped at the patient's own request, as he felt sharp stabbing pains over the front of the chest. Five hours after the operation, the pulse was 100, the respirations 24, and the temperature 100·2: the pain in the chest had disappeared. On the 23rd July he complained of a "crushing" pain along the sternum, and of shortness of breath. The pulse was 120, the respirations 26, and the temperature 102·5. The friction sound was again distinctly audible. A fly blister was therefore applied above the right nipple.

On the 27th July the following report was taken:—"The patient feels no pain in his chest, and can lie with ease in any position. The friction sound is gone, and the respiratory murmur is more audible. Pulse 92, respirations 14, temperature 98·7."

On the 1st August he left the hospital without permission, and has not since been heard of.

Examination of the fluid removed from the chest: Colour opaque yellow, sediment none. Sp. g., 1020. Reaction slightly alkaline, contains an abundance of albumen, (a column of the fluid in a test tube measuring three inches in height gave, on heating, a column of albumen measuring two inches). On microscopic examination the fluid was found to contain crystals of cholestrine, cystine, and tyrosine, with granular matter and pus and blood corpuscles.

II. *Case of Tubercular Peritonitis, with Effusion.*—W. L., aged three years, was admitted into the Infirmary on the 6th of March, 1873, in a state of extreme debility and emaciation, his abdomen being enormously distended. The family history was good, except that one boy, out of a family of six, had his foot amputated for what appears to have been strumous disease of the ankle joint. Until three months prior to admission, the patient seems to have been strong, vigorous, and thriving. At this time, without known cause, he was suddenly seized with severe rigours, and became cold and livid; and this was followed by diarrhoea, which has since persisted. Six weeks afterwards his belly began to swell, and about this time he frequently cried out, and was observed to roll his head about; but there was no clenching of the hands and no strabismus, and he never had convulsions.

At the time of his admission he had a slight cough, his tongue was coated with a yellowish-white fur, his appetite was indifferent, his bowels loose, his temperature 100·4, and his pulse 140. The abdomen was very much enlarged, and the skin tense and shining, while the superficial veins were very distinct. There was considerable tenderness on pressure; the percussion was tympanitic in the upper half of the abdomen in front, and dull below and at the sides, while fluctuation was readily detected.

On the 7th March, he was ordered milk diet, soup thickened with isinglass and arrowroot, an ounce of port wine, and five drops of laudanum by injection.

On the 8th of March, paracentesis abdominis was per-

formed, the needle being introduced in the left flank. On this occasion only six ounces of fluid were removed; but upon the 10th March, 42 ounces were drawn off, and within half-an-hour of the operation he was cheerful and comfortable, and evinced very decided relief. The fluid removed was thickish, pale green in colour, rich in albumen, of sp. gr. 1023, and showed microscopically fibrine, inflammatory lymph, and a few blood corpuscles.

The day after the second operation the little boy was quite comfortable; the abdomen was much reduced in size, the bowels were regular, the pulse 116, and the temperature 100 in the morning, and 101 in the evening. Cod liver oil inunction over the belly, night and morning, and a teaspoonful thrice daily was ordered.

On the 14th March, owing to slight gastric derangement and diarrhoea, the *internal* administration of the oil was discontinued, and a laudanum injection administered. Six drops of the liquor cinchonæ, three times a day, was prescribed, and the port wine was increased to two ounces. Temperature 98·4.

On the 18th March it was found that the abdomen was again much distended with fluid, and the boy was restless, his face was livid, and his respiration hurried. The pulse was 136, and the temperature 104·6. The operation was therefore repeated, 41½ ounces of the same fluid was drawn off, giving almost immediate relief.

On the 6th April, the report states that, with the exception of an attack of diarrhoea of two days' duration, during which the temperature rose to 102·3, he has been steadily improving since the last operation. There has been no tendency to re-accumulation of the fluid, he is evidently free from pain, he takes his food with relish, and he is sitting up in bed looking pleased and cheerful.

On the 11th of April, it was stated that the abdomen was nearly of the normal size, no fluctuation could be detected, he was rapidly gaining flesh, and his stomach and bowels were performing their functions naturally. Shortly after this, as he continued well, he was allowed to return home.

These two cases illustrate very well the great benefit which may often be derived from the operation of paracentesis, and the comparative safety with which the operation may be performed with the aid of the pneumatic aspirator. The instrument used on both occasions was Weiss' modification of Dieulafoy's apparatus, which is admirably adapted to the purposes which it is intended to serve.

V.—NOTES OF CASES WHICH SUGGEST SOME PROBLEMS IN OTOTOLOGY,
AND QUESTIONS IN AURAL PATHOLOGY.

By JAMES PATTERSON CASSELLS, M.D., M.R.C.S., Eng., &c., *Surgeon to and Lecturer on Aural Surgery at the Dispensary for Diseases of the Ear, Glasgow.*

*A FINE healthy boy, aged 14 years, went to bed complaining of a slight cold. In the morning, when he awoke, he was *absolutely deaf to all sound*. He appeared to be confused, as may be surmised, and when he attempted to walk, he *staggered* as if under the influence of an intoxicant. It may be well to state, that he had suffered from some ear affection due to one of the exanthemata a few years before the time of the occurrence of total deafness, and that a younger member of the family had suffered from the same cause, whose hearing, at the time I speak of, was only in a slight degree impaired. The patient was subjected to various forms of treatment for nearly a year without benefit: he remained deaf, and staggered in his walk. One day, about this time, he reported, on coming from school, that he had *suddenly recovered* the power of hearing in his right ear, and that this improvement had continued for about a quarter of an hour, at the end of which time it as suddenly vanished. From that time till now (13/12/71), when first seen by me, he has remained totally deaf, and still staggers as he walks.

The result of a careful examination of this case, showed that the patient was totally deaf, whether to *articulate sound* or the *transmitted tones* of the diapason. The membrana tympani on

* The notes of the cases here reported are taken from my journal, in which each case is fully detailed; far more so than in the above communication. The words in *italics* refer to the points of interest in each case.

both sides collapsed. The short process of the malleus standing out prominently; the manubrium from its oblique position appearing foreshortened. Prussak's ligaments strongly marked. The membranes both diminished in lustre and transparency, permitting only of an indistinct view of the incus and stapes. There were no signs of congestion in the cavities of the tympana, nor did either of them contain fluid.

The morose temper of the boy, indeed his resistance, which amounted to violence, prevented anything being done for his affection. One or two imperfect attempts to inflate the tympana resulted, however, in slight improvement, in so far that he could *hear* street noises, and distinguish between the noises made by heavy and light, slow and swift conveyances, as well as perceive the *transmitted* tones of the diapason. The peculiarity of temper, above alluded to, compelled me to abandon, with great reluctance, the further treatment of this case. Quite recently I heard concerning him. He is in the same condition as when first brought to me.

The theory which I entertain as to the conditions requisite for the perception of *articulate speech*, as distinguished from the perception of *transmitted tones*, constrained me to regard the deafness in this case as due to *excessive pressure* upon the labyrinthine contents, which had, by its long continuance, caused partial or complete atrophy of the auditory nerves. This conclusion was hardly justified by the subsequent recovery of the perception of the tones in the manner above indicated, although it strengthened the diagnosis as to the cause of the loss of function.

A healthy man, aged 34 years, while serving on board ship at sea in the tropics, was seized in the following manner. Aloft doing duty, he became sick and vomited, and with difficulty reached the deck, owing to giddiness and a roaring noise in ears. When he attempted to walk he *staggered* and fell. What took place after this was related to him some days subsequent to this occurrence by a shipmate. On falling he appeared to become insensible, but was not convulsed. He was carried to bed, where he lay for some hours in the same state. On awaking he was at first confused, and unconscious of all that had occurred

up to the time of his arrival on deck; but after a few minutes he recollected everything from the commencement of the attack till he fell, as already related. He had still the *ringing noise in the ears, was totally deaf*, and, when he attempted to walk, *he staggered* like a drunken man. This was his condition when he consulted me, seven years after the attack I have described above. He had been under treatment in the United States and in London without any, even the smallest, change in his condition.

Examined; he was suffering from general katarrh of the tympana and tubes, evidently secondary to well-marked acinesia of the tube and pharyngeal muscles. He was totally deaf to *articulate sound*; but could perceive clearly, and distinctly distinguish the difference in the tones and semitones of the diapason when *transmitted through the cranial bones*. His hereditary history was good—he never had any previous ear affection, and never suffered from syphilis. The prognosis in such a case was not doubtful; *it was decidedly bad*. Nevertheless, treatment was commenced, and in consequence in a few weeks he was able to hear a loud shout close to the meatuses. At this stage, when the correctness of the principle upon which the treatment was based was about to be tested, necessity compelled him to go into a distant part of the country.* I have not heard from or of him since.

A little, sprightly, and intelligent girl, aged 7 years, came in from school complaining of ear-ache in the left ear. Next day she had a similar complaint to make of pain in the right ear. The family medical attendant saw her, and for a week had treated the case very judiciously. He was alarmed, however, at the total deafness which had continued now for a week, indeed he was not quite satisfied whether she heard at all when first seen. Enquiry elicited the statement that at the outset of her illness she had *vomited without apparent cause* and *staggered* in her gait. She was pale and weak when I saw her, in consultation, about ten days after the onset of the illness, but bright and active. She was curious as to the cause of the silence that

* He was a dispensary patient at my *clinique*. It is not unworthy of remark that the use of tobacco always made the subjective tinnitus louder.

reigned, "Just like a Sabbath, ma," she said. She *tottered* and *rolled* from side to side when she attempted to *walk*. This peculiar movement was quite different from that which results from weakness consequent on recovery from a long illness; for I found that many months after the date of my first visit, and when the health was robust, she had this peculiarity of gait; indeed, for many weeks, she had to be supported on each side in attempting to walk.

On examination the case showed signs of general congestion, and the right tympanum, the last affected, contained serous exudation. Both Eustachian tubes were open, but their muscles inoperative. She was absolutely deaf to *all sound*.

I gave my opinion of the case, as one not likely to recover, so far as the function of the organs was concerned.

To remove the serum from the middle ear, I at once performed parakentesis, and, when she was able to come to my residence, the Voltaic and Faradic currents were used, with the result of enabling her to perceive the *vibrations* of the diapason and *loud shouts* close to the ear. It was on several occasions tolerably clear, that she could distinguish the words (monosyllables) shouted into her ears.

At the outset she had no subjective noise in her head or ears, but on three several occasions, when *straining* at stool, she had terrific subjective tinnitus, so terribly loud that she was afraid to enter the closet, evidently placing the cause of her distress outside of the body. This tinnitus lasted only a few minutes on each of the three occasions referred to. She is still under treatment. She is beginning to suffer from *secondary katarrh* of the tympana.

A little girl, of vivacious habits, aged 5½ years, was attacked by some form of *fever*, it is said, although this is by no means clear. She was insensible for many days. When she recovered consciousness she was very deaf, but not *totally so*. Gradually, however, she became deafer, and *staggered in her walk*, and when I was consulted, 18 months after this attack, she was deaf to all *articulate sound* and still walked badly. She could *hear the tones* of the diapason, a discovery which seemed to please her exceedingly, judging by the expression of the face.

The condition of the tympana clearly indicated a vasomotor paralysis of the tissues. She had very bad *granular pharyngitis*, so bad, indeed, that I can say I never saw a worse case.

She came from a distant city to have an opinion, therefore a plan of treatment was mapped out, and her ordinary attendant communicated with. I regret to say that the difficulties in the way of carrying out the programme I had suggested, were to some extent insurmountable. Some time ago I heard she was in much the same state. I need not say that in this case at the outset the prognosis was decidedly unfavourable.

A gentleman, aged 50 years, of full habit of body, but temperate in his living, consulted me in the spring of 1873, complaining of slight deafness, which had troubled him for several years. His infirmity necessitated loud talking, but did not seriously limit his usefulness. He had been already under treatment without any beneficial result.

The condition of the ears proved incontestably that he had suffered from some inflammatory affection of the tympana and Eust. tubes at an early period in life. The tube and pharyngeal muscles were *feeble* in their action; this was specially noticeable in the soft palate. The uvula was drawn to *one side* (the left). He had slight subjective tinnitus in both ears, and a *shakiness* in his legs when walking. He volunteered the statement that this was recent, and worse when the bowels were constipated; further, that some time before consulting me, he had suddenly lost the *faculty of speech*, but had now quite recovered.

He remained under treatment for two weeks, and was benefited in a slight degree. I now recommended that the treatment be intermitted, and that the interval should be spent in the country. I saw no more of my patient for several months.

I was surprised when, one day in the middle of the following winter, he was ushered into my room, holding up both hands and shaking his head, at the same time saying, "I cannot hear at all now."

The history of this interesting case in the interval of absence was as follows:—Continued in the same state as when last seen by me, till two weeks before he returned. One day, being irritated in his temper and excited by business, on his way home

he had a "great roaring noise" in ears, and became suddenly deaf to *all sound*. He also staggered in his walk at the time, and when in the course of the following days the noise at any time was unusually loud, he staggered a great deal more.

On examination, I could not distinguish any difference in his condition from that which I had previously observed and noted on his first visit, with the following exceptions. He was totally deaf to *articulate sound*, but *transmitted* tones he heard apparently in perfection. He walked much worse, and he spoke with a little difficulty, as if he had some throat affection. Also, the signs of weakness of the naso-pharyngeal and tube muscles were more pronounced. He was placed under treatment not without a hope, notwithstanding the unfavourable prognosis formed, that the capability of perceiving articulate sound might be restored. To a certain extent this was obtained; he could hear loud shouts near to the ear, and all the tones within the compass of the human voice, the low ones being more distinctly perceived. At this stage in the progress of the case, he heard of "a cure of deafness by the acetic acid treatment." Seeing that he was disposed to believe in a universal panacea for human ills, and that that one was acetic acid, I dismissed him from my care (temporarily), in order that the acid might have a fair trial. I heard lately from his ordinary medical attendant that he is using this agent, and, it is almost needless to add, that his condition is unaltered.

A young woman, aged 25 years, was sent to me suffering from a severe attack of *purulent tympanitis*. From the appearance of the tissues of both ears, it was evident that the present attack was quite recent; grafted, so to speak, upon long existing disease of the tympana.

After being under treatment for about two weeks, I removed from the tympanic cavity of the left side, what proved on examination to be the whole cochlea in a necrosed state. The modiolus and scalæ were nearly perfect; indeed, the specimen bore a strong resemblance to the figures of the cochlea in Munroe's (*secundus*) celebrated monograph (1797).*

* This case is more fully reported in the recent work, "The Questions of Aural Surgery," by Mr Hinton. The specimen is also figured in his "Atlas of Ear Diseases."

After the removal of this essential part of the labyrinth, she heard my watch about *one inch* from her ear, the right being carefully closed. She appeared not to have suffered any marked change in her perception of articulate sound.

More astonishing, however, she could perceive with apparently *undiminished distinctness*, the *transmitted* tones of the diapason, and *all the tones*, as well as *semi-tones* of the piano, the right ear during this latter experiment being closed effectively to the entrance of sound.

For several months after the removal of the necrosed bone, she had tinnitus of a "roaring" character, *much giddiness*, and frequent vomiting. At this time, so badly did she walk that she had to be supported when moving from one place to another. This inability to walk and tendency to fall was always accompanied by great giddiness and loud tinnitus. Had perfect command over, and power in, her legs, but could not keep the *perpendicular* position. The tendency to fall always seemed more to the left side. With the exception of the ear disease and the symptoms above described, she had no disease of any other organ or part of the body.

Within the last few weeks, she presented herself again for examination. This showed that the ear disease (otitis med. pur.) still continues, but she has nearly recovered from the distressing symptoms above described. Occasionally she is slightly giddy, and at such times staggers in walking.

A fine, healthy boy, aged 14 years, received upon the head a blow from a pebble. No *immediate* bad consequences followed. Some time (months) after this occurrence he had a severe attack of *keratitis*, for which he received (according to the parents) heroic treatment, chiefly in the form of mercurials. During the continuance of this eye affection, and after his recovery from its more acute symptoms, he was debilitated in body—delicate, in fact. From this state he appears to have completely recovered, after a prolonged residence in the country.

About eighteen months or two years after his recovery from the debilitated state above alluded to, he began to complain of slight deafness, which was worse during the winter months or the prevalence of wet weather. For this deafness he had treat-

ment, without marked benefit. Again he was sent to reside in a dry, bracing atmosphere, in the hope that the ear affection might be benefited thereby. He was much improved by this change—indeed, the deafness was *apparently* cured. This favourable result was, however, of a very temporary character, for on his return to town the symptoms, indicative of his former ear disease, remanifested themselves. In brief, his history during the next four years may be summed up by saying, that nothing was left undone which was likely to benefit him. In spite of everything, however, the progress of his disease was a steady, onward one, to complete deafness to articulate sound, the state in which he was when my opinion was asked respecting the case. Here, for reasons that, by-and-bye, will be obvious, I may state that the hereditary history is good; all the members of the family, both those born before and after the subject of this history, are free from, and never have had, any form of eye or ear disease. Nor do they present the smallest trace of inherited syphilis. Concerning this latter point, I have been especially inquisitive in my examination. The result is as I have stated.

The patient's present condition is as follows:—Deaf to articulate sound, *also to transmitted tones*. Complaints of subjective tinnitus, constant in both ears. Both membranes are opaque, without lustre, thickened in all their layers, concavity almost normal. Around the manubrium and short process of the malleus in each ear, is a tract of deeply-congested and hypertrophied membrane. This is worse in the right ear. The nasopharynx is slightly granular, much congested, and all the structures hypertrophied and highly sensitive. The soft palate droops; the uvula is drawn to one side; his sense of smell is unimpaired. He does not hear his own voice reverberating when he speaks. Has *notched teeth*, the upper lateral incisors being very much scooped out; indeed, all his teeth are much decayed. As a child, he had a good primary set. His present ones began to decay and present their notched appearance (parents' statement) after the mercurialization undergone while suffering from the keratitis. The Eustachian tubes are nearly sealed up by reason of the relaxed and swollen tissues; they are, however, easily made permeable. The tube muscles are almost

paralysed, at least, if they act, they do not appear to exert any influence upon the cartilage of the tubes. The fact was elicited that frequently in his long illness he had suffered from giddiness and unsteadiness in walking; and, indeed, he seemed always to stagger in walking. How far this might be due to his slightly impaired vision, I do not feel qualified to determine. He volunteered the information that he staggered more at night than during the day time. I may remark that this patient is highly educated, and most amiable in his disposition.

In diagnosing this case, no difficulty occurred so far as concerned the conducting and accommodating parts of the organ. Their condition was too apparent. What was the condition of the internal ear or labyrinth? As I did not wish to affirm anything inconsistent with, or beyond the somewhat conjectural, yet received, opinions concerning the functions of the several parts of the internal ear, I answered this question by saying, that some structural change had taken place in the labyrinth, whereby the auditory nerve was unable to perceive the sound emitted by vibrating bodies. The prognosis was unfavourable.

The patient having already undergone every conceivable form of treatment, except by electricity, without, as already stated, the smallest benefit, it was left for me to propose the use of the galvanic current, with the object of diminishing the subjective tinnitus.

An eminent electro-therapeutist had expressed an opinion, two years before I saw the patient, as to the desirability of prolonged electrization of the ears, in order to rouse into activity the dormant nerve. This recommendation I could not endorse, for I conceived that we had to deal in this case, not with a *dormant* nerve lying ready to be roused into activity, but with one surrounded by conditions unfavourable to the exercise of its normal functions.

With the object above stated, viz., to lessen the tinnitus, he was treated by the constant, Voltaic current, from a Siemen's and Halske pile, and occasionally a Volta-Faradic current to the tube and tympanic muscles.

The result of several weeks' treatment, as above indicated, was a slight diminution in the intensity of the tinnitus, more marked, however, at the commencement than towards the end of the treatment. No change took place in the function of the organ during this period, and after the electrical treatment was suspended, the tinnitus regained its original tone and intensity.

The Volta-Faradic current increased the subjective tinnitus; this was especially noticeable in the left ear, and particularly when, on that side, the tensors tympani and palati were stimulated.

The effect of the constant (voltaic) current was peculiar, as follows:—6 El., anode in the right ear. An. S. K. >. An. D. lessened the tinnitus in right ear, increased it in left. An. O. K. > (very loud metallic sensation, louder than at closing of the chain). 6 El., anode in left ear—no response. 10 El., An. S. K. >. (loud metallic report sounds, like the letter u, very deep). An. D. k. >. (faint singing). An. O. K. >. (loud metallic report, as in An. S.) All these responses became louder towards the close of each sitting. After a short time 12 elements were constantly employed, with uniform responses manifesting themselves in a peculiar way, thus:—For the right ear, Anode in R., Katode in left hand. An. S. K. >. in *left*, not in right ear. An. D., no response. An. O. K. in *right*, not in left. (With the anode in the right ear, loud metallic response in *left* on closing the chain, but on opening it similar response in *right*.) In the left the same number of elements produces great burning sensation at point of contact of Rheopore with skin. 3 El. are used in place of 12, and with Anode in the ear the responses are An. S. k. > (in *left* not in right). An. D. (no sensation). An. O. K. >. (very loud metallic sensation of sound in left). Having regard to Pflüger's theory of electrotonus, and its therapeutic value in such cases, this arrangement in the direction of the current was adhered to throughout the course of treatment.

I have appended these brief notes of the electrical treatment of this case, in order not only that those who are interested in the disputed question of the electrization of the auditory nerve

may compare the results I have obtained with their own in similar cases, and with Brenner's normal formula,* but with the further object of propounding (what they seem to suggest) some pathological and physiological questions of rare interest. Meantime I reserve the comments which I intend to make upon these cases for a future communication.

VI.—CASE OF ACUTE RENAL DROPSY.

By W. T. GAIRDNER, M.D., *Professor of Practice of Medicine, University of Glasgow, Physician to the Royal Infirmary, &c., &c.*

Case of Acute Renal Dropsy, of ten days' standing, obstinately resisting all treatment, and ending fatally at the end of about seven weeks. Slight febricula for four or five days only. Very little desquamation of epithelium, but intense albuminuria, with hyaline and fatty granular casts. P. M.—Cloudy and granular epithelium, without much displacement. Large white kidney.

THE following case occupied, with three or four others, the chief place of interest in a brief summer course of lectures, devoted to a review of renal pathology from the clinical point of view; and being, from its unfortunately fatal termination, rather more than usually complete in its details, it is here recorded in the hope of its being useful both to those who witnessed the facts, and to others engaged in like studies. I hope, from time to time, to publish, perhaps with less detail, other cases bearing on the disputed questions in the modern pathology and treatment of Bright's Disease.

James M'C., æt. 12, employed in a printfield; admitted to Ward 7, Royal Infirmary, May 5th, 1874. The leading complaint is of dropsy, which is of ten days' standing. [A previous history of slight shivering and cough, with hoarseness, extending back to four weeks before admission, did

* I here give Brenner's formula of the normal response of the auditory nerve to electrical stimulation:—(K. S. K. K. D. K. >: K. O. >. An. S. —. An. D. —. An. O. K. >.)

not appear, after careful scrutiny, to justify a diagnosis of preceding scarlet fever, especially as an uncle who came to visit him, said he was quite sure patient had passed through scarlet fever when three years old.] Patient is hoarse, and a little deaf; eyelids puffy; abdomen slightly distended; feet and legs cedematous; urine, sp. gr. 1037, highly acid, copious deposit of very pale urates, abundant albumen. No tube casts detected (May 6th) on careful examination. A reddened state of the mucous membrane of the throat observed, but no traces of ulceration, either on direct inspection, or by the laryngoscope. Movement of vocal cords equal on the two sides. (*Cream of Tartar electuary.*)

May 8th.—Scarcely any, if any, trace of fever; pulse 76; skin dry, perhaps a little warm; tongue absolutely clean and normal. Abdomen somewhat distended, and with evidences of fluid in peritoneum. No pain anywhere. Pressure in loins is quite unattended with pain. Urine, sp. gr. 1032, a sediment of urates almost colourless and amorphous; on clearing this by heat, or by potash, nothing remains at all resembling an epithelial sediment, such as is commonly observed in scarlatinal dropsy; albumen in large amount. (A most careful and protracted microscopic examination at first failed to detect anything but the urates; afterwards only two or three tube casts, only one with epithelial contents.)

May 9-12.—(*Warm wet sheet packing for four hours on three successive nights.*) Patient has been feverish for 24 hours, and urine diminishing in quantity (only six ounces passed on 10-11th); temp. 103·6° on the evening of the 11th. It is supposed that patient's relatives have supplied him with improper food, contrary to orders. (*Wet pack discontinued.*)

May 14th.—Febrile movement continues; evening temp. 102°-103°. Urine, 10 to 17 oz., sp. gr. 1026 to 1030, sediment of urates always present, and albumen abundant. To-day immense quantities of microscopic crystals of uric acid, with very much less than the usual amount of colour, indeed nearly colourless, although sometimes aggregated in groups.

Along with these, tube casts, not very numerous, and often fragmentary, wrinkled, and having to the eye the appearance of not quite recent formation, containing only a few nuclei, and by no means associated with any considerable amount of epithelium; a few detached epithelium-cells appearing rather tessellated than globular. Except a degree of sickness, which has led to vomiting two or three times, there is no complaint. (*Wet packing resumed. Milk diet.*)

May 22nd.—Febrile temperatures up to 17th; since then, absolutely normal or subnormal. The general effect of the wet pack has been to produce a reduction of the evening temperature of from 2° to 3° F. In other respects no improvement. Urine, since the fever terminated, has been diminishing in quantity (from 23 oz. on 15th to 7 oz. on 19th, and 9 oz. on 21st); sp. gr. 1031-34. The sediments of urates and uric acid have disappeared, and there is now an appreciable amount of what appears to the eye as mucus, without the least trace either of blood or of distinct flocculi. Under the microscope, tube casts in very moderate numbers, to a very slight extent epithelial; for the most part either hyaline or hazy with molecules, and in some instances with a few nuclei. The casts are of rather small diameter. A very few nuclei and small epithelium-cells in the free field, but nowhere any masses of epithelium either in casts or otherwise. (*Wet pack discontinued. Milk diet, with a little cream of tartar, used so as to produce relaxation of the bowels.*)

May 27th.—Increase of cough, without expectoration, observed for some days. Urine 10 to 14 oz., sp. gr. 1032-36. (*Imperial drink instead of electuary.*)

May 29th.—Increase of dropsy all over the body. Urine 11 oz., sp. gr. 1032. Characters as before. From first to last the urine has never contained any appreciable amount of blood, either to the naked eye or with the microscope, although on one or two occasions individual corpuscular forms in the microscopic field have raised a question as to the presence of blood corpuscles. Temperature persistently subnormal. Bowels are freely open, without being very loose. Breath-sound puerile over the apices, feeble at both

bases, with traces of mucous crepitation about the level of the seventh dorsal spine. The first sound of the heart is universally feeble or all but suppressed, the second sound exaggerated, especially over the pulmonary artery, but also in the carotids and at the back. Radial pulse is certainly not weakened in proportion to the first sound, and is perfectly regular, 86-88, and fairly normal in character, though perhaps rather small. No evidence of pericardial effusion. No expectoration. Tongue a little coated on the dorsum, but towards the tip quite clean. (*Pulv. Jalapæ Co. 10 gr. ter die.*)

May 31st.—Bowels moved six or seven times a day. Cream of tartar electuary continued along with the jalap, to six teaspoonfuls or more daily. Urine 11 to 15 oz., sp. gr. as before. No improvement as regards dropsy; circumference of abdomen increased in two days from 31 to 33 inches. Patient complains of umbilical pain.

June 1st.—Urine of last 24 hours only 6 oz.; sp. gr. 1033. Albumen in very large quantity; sediment very much as at last detailed observation; but several of the casts observed to-day present traces of fatty granular matter throughout (*i.e.*, not merely a haze of molecules, as described May 22nd, but distinctly refracting granules.)

June 3rd.—Paracentesis abdominis performed with the aspirator and fine trocar last night; 90 oz. of fluid drawn off, so clear and colourless as almost to resemble rain water, but faintly albuminous, sp. gr. 1008. The urine of yesterday was only about 2 oz, and this morning about 4 oz. more have been passed, not essentially differing from previous specimens. No discomfort; P. 84. T. 97-8°. Remedies intermitted since 1st June. (*Resume imperial drink.*)

June 9th.—Feels somewhat relieved; but urine, even under the diuretic drink, has not exceeded 15 oz., and the mean of the last six days is only 12 oz., the bowels being only just freely open without any fluid evacuation. Characters of urine exactly as before, except that the fatty granular element in the sediment is apparently increased. Temperatures have been absolutely normal or subnormal. A hot

air bath given last night raised the temperature for a time by 0.9° F. The wound in the abdomen still oozes a little, but does not appear to cause any inconvenience.

From this time the patient was obviously getting worse, day by day; the hot air baths, repeated on three occasions, did no good whatever (possibly even the opposite). The opening closed on the 12th; on the 13th patient complained of pain in the abdomen, and fomentations were applied. Dropsy still increased in the legs and scrotum. On the 15th, at 9 p.m., vomiting occurred; next morning the stools were passed in bed, and patient was unconscious, with contracted pupils; breathing laborious, 25; pulse almost imperceptible, over 100. Death took place shortly afterwards, without any distinct convulsion. It is to be particularly remarked that no trace of any nervous symptoms, of the character usually regarded as uræmic, had appeared up to within a very short period before actual death.

Synopsis of the temperatures.—In general it may be said that the temperatures, recorded at least twice a-day throughout the period of observation, show little, if any, positive abnormality up to the 11th May (sixth day after admission), when a somewhat sudden rise—M. to 100.4° and E. to 103° —was observed, the temperatures continuing more or less febrile, but apparently decidedly checked by the wet pack, up to the 17th May, after which none but normal, or rather subnormal, temperatures were indicated (97° – 98°) until the 8th of June, when under the influence of the hot air bath 99.2° as a maximum was recorded. Towards the close of the case, symptoms of peritonitis in a very obscure form occurred, but it cannot be said that any distinct febrile movement was due to this cause; and on the other hand, scarcely any symptoms of fever can be said to have accompanied the invasion of the dropsy, although, of course, the evidence is incomplete on this point. The subnormal temperatures of the middle period of the case were probably due in some degree to blood-poisoning, although distinct uræmic phenomena were absent.

Synopsis of the state of the Urine, with Remarks.—Notes

of the quantity, specific gravity, and other characters of the urine, in this case, were made almost daily, from 9th May to 13th June, the ordinary urine-rolls being kept by Mr Cowie, and frequently checked or corroborated through observations made at the visit hour by myself and Dr Finlayson, in the presence of numerous students, and at other times by Dr Foulis, my resident assistant. It can rarely be, that an opportunity occurs for bringing together, in so condensed a form, the whole narrative of urinary phenomena in a case of what was proved by post-mortem examination to be a typical instance of the "large white kidney," and what in point of its clinical characters may be defined as an equally typical case of acute (if not actually scarlatinous) renal dropsy, fatal within eight weeks after the first dropsical symptom, and not more than ten weeks after the supposed attack of febricula, which *may* have been (but is not proved to have been) the real starting-point of the history.

Considered in relation to the acute development of the symptoms, and the clinical characters of the case generally, the most remarkable points are—1st, the almost entire absence of epithelial elements and tube-casts in the urine on and after admission, *i.e.*, less than two weeks after the first origin of the dropsy; 2nd, the absence of blood-corpuscles, or of blood-colour in appreciable amount, throughout. And this last fact, the importance of which was fully considered at the time, and led to the precise statements recorded under date May 29th, derives a new interest from the discovery after death of some convoluted tubes actually containing blood, amid a much greater number with epithelium but little altered, and some with fatty granular exudation. It is perhaps a legitimate inference either that in the earliest period of the case no desquamation of epithelium had taken place, or that the whole of the shed epithelial elements detached from the convoluted tubes near the Malpighian bodies were retained in the kidney, while a very scanty urine was excreted from the straight tubes of the pyramids, or perhaps from the inter-

mediate loops described by Henle. However this may be, the simple facts now placed on record seem to show that in this case, as in the cases first described by Dr. George Johnson under the name of "non-desquamative disease of kidney,"* the shedding of epithelium on the one hand, and the presence of blood in the urine on the other, cannot be regarded as belonging to the essence of the morbid process. Dr. Johnson argues on theoretical grounds that the absence of epithelium in such cases is a fact of unfavourable interpretation, and the fatal result of the present case as of his own first case (John Ager), might seem to confirm this view, were it not that other cases like those at pp. 373-74 of his earlier work, may be set against the former; and I have had during the last year occasion several times to examine the urine of a lady who was brought under my notice as a candidate for insurance, being conscious of no complaint whatever, in whom a *perfectly clear urine, highly albuminous, and without a trace of epithelial or other sediment*, is the result apparently of an attack of scarlet fever, from which she supposed she had perfectly recovered, so far as any positive symptom was concerned; the discovery of the albumen in the urine by her medical adviser being purely accidental. I have frequently observed such cases in the more chronic forms of albuminuria, but never before the present case, so far as I remember, within a fortnight after a first attack of acute dropsy. The present case also shows that the distinction between the "non-desquamative" and the "desquamative" forms is not absolute, but that a perfectly gradual transition may take place from the former to the latter form, and with exactly the same fatty granular formation in the epithelium and casts as in the more evidently desquamative cases.

In the case of James M'C., the urine for a day or two after admission was not accurately measured, but it was undoubtedly very scanty, probably not more than a few ounces in the twenty-four hours. From the 9th of May

* Diseases of the kidney, 1852, p. 342, *et seq.* Lectures on Bright's Disease, 1873, pp. 33, 34.

onwards to the end of the case, every effort was made to obtain the whole quantity passed for exact measurement; and although there may have been unavoidable errors or oversights, I have every reason to believe that the boy took pains to separate the urine from the *fæces*, and the nurse is confident that he did so habitually, even when his bowels were loose. It is, however, a striking fact, and shows how difficult it may be, under such circumstances, to arrive at a true estimate of the whole of the excreted nitrogen from the examination of the urine, that on two days near the close, when diarrhoea was present, and I directed the *whole* of the discharges to be measured *together*, the quantity was 60 oz. each day, while the urine alone, as collected in three previous days, was in no instance noted as more than 10, and on one day apparently only 3 oz., the greater part of it having evidently been lost.

The very scanty urine passed on admission had a specific gravity of 1037; and up to May 14th (nine days after admission, and nineteen days after the attack of the dropsy) the sediments were composed of pale urates. On May 14th there were no urates, but instead of them a very large amount of uric acid in nearly colourless crystals. When these sediments were dissolved by heat or by potash, the urine appeared to be of nearly natural colour, and to the naked eye absolutely without sediment; the microscope detecting in it only with great difficulty, and after much searching, the merest traces of hyaline tube casts, with a very few detached nuclei. The discharge of uric acid crystals on the 14th May seemed to concur with a change in the characters of the urine, which may also be said to have nearly coincided with the termination of the febrile movement above recorded as extending from the 11th to the 16th May. After this, an appreciable, though a very scanty, mucous or epithelial sediment took the place of the urates, which latter sediment entirely disappeared,* although

* Uric acid crystals were noted on one occasion afterwards, but no urates, and as a rule nothing but the slight epithelial sediment here described appeared at any future stage.

the urine from the 17th May onwards was diminishing in quantity, and on the 19th was only seven ounces, sp. gr. 1034. The sediment, scanty as it was, contained tube casts, not at all numerous, and to a slight extent epithelial, "for the most part either hyaline or hazy with molecules, and in some instances with a few nuclei." No masses of epithelium were observed, and the casts were mostly of that rather small diameter which (according to some authorities) bespeaks their formation in tubes not yet despoiled of their epithelial lining. There was no blood observed, at least none that distinctly altered the colour or gave a characteristic microscopic sediment at any period of the case. The only change, in the latter periods, in the microscopic appearance of the sediments, was a somewhat greater, but still not a great, amount of fatty granular matter in the tube casts and epithelium. The urine continued scanty to the last, the greatest quantity noted at any date after the 17th May being 15 oz., while the mean of all the notes of quantity for a month, May 9 to June 9, during which the urine was, it is presumed, carefully collected, was $13\frac{1}{2}$ oz. The absolutely greatest quantities noted were in the latter days of the brief febrile attack described as occurring May 11 to 16, when the urine on one occasion reached 23 oz., and on three others 17 to 19 oz. At this period also the specific gravity was as low as 1026, while at no other period of the case was it ever below 1030. The actual solid contents of the urine probably varied but little throughout. Unfortunately it was not found convenient to make any detailed analysis, but there can be no doubt whatever, judging from the data given above, that the excretion of urea was as very imperfectly performed. The albumen was in very large quantity throughout, and did not appear to vary much during the progress of the case. The chlorides were not obviously deficient.

Synopsis of treatment, with remarks.—On the general statement of the facts in this case, it seems as if scarcely anything could be learned from the treatment, except the utter failure of all the various remedies employed; and under any point

of view, the case is not an encouraging one for the therapist. In speaking of it from this point of view, we had to compare it with another almost equally obstinate case, in which, however, a slight improvement was observed under the hot wet pack, and afterwards under internal remedies, while a spontaneous diarrhoea proceeding independently of remedies, seemed to be a kind of outlet for the morbid accumulations in the blood. With these, a third case under treatment at the same time is in very marked contrast. In this last case, a very extreme form of dropsy, with highly albuminous urine, coming on in a man of decidedly intemperate habits, and asthmatic for several years past, with various, though slight, evidences of vascular change, has been almost instantly resolved under the cream of tartar electuary in large doses, without almost any noticeable disturbance of the bowels, but with a very marked increase in the quantity, and a corresponding diminution in the specific gravity of the urine, which in five days after admission attained to a maximum of 254 oz., and subsided again gradually towards the usual level as soon as the dropsy was relieved. The comparative statement in detail of the facts of these three cases would perhaps afford more ground for remark than any of them separately considered; but in the meantime I shall confine the observations to the case of James M'C.

The treatment first adopted was by the electuary of cream of tartar; but in a few days this was followed up by the warm wet sheet packing, which was employed on three successive nights, the patient remaining about four hours in the warm bath thus administered. On the third day of this treatment, the temperatures, which had been apparently normal, or not exceeding 99° as a maximum, ran suddenly up to 103.6° , and for several days afterwards varied between 100.5° and 102.8° on the sixth day after the beginning of this febrile attack; never afterwards exceeding, but rather, on the whole, falling short of the normal standard. That this rise of temperature was not due to the treatment may be inferred from the fact that on almost every occasion

except the 11th of May, the wet packing employed before, during, and after the febrile attack, had the effect of distinctly lowering the temperature for a time; so that the evening temperatures taken after the bath were usually from 0.5° to 2.5° lower than the temperatures taken immediately before it, and often also lower than the morning temperature of the same day. This is precisely the converse of the effect observed from the hot air bath, which was employed a few times in this case, with the apparent effect of raising the temperature appreciably, though not greatly, above the normal level in each instance. Moreover, the hot wet pack was always grateful to the feelings of the patient, while the hot air bath, whether as regards subjective sensations or actual objective results, appeared rather to be detrimental in its immediate effects. The wet pack, however, though apparently beneficial on the whole rather than otherwise, had no effect whatever upon the dropsy, and no distinctly appreciable effect upon the urinary evacuation, which, on the first appearance of febrile symptoms, diminished to 6 oz., and afterwards rose to 23 oz. on the 15th May, only to decline again to 7 oz. on the 19th, and 9 oz. on the 21st. After this the wet pack was not resumed, as the temperatures were always subnormal, and it was feared the patient might be unduly chilled during or after the administration. And further, medical treatment was entirely suspended during the greater part of the period of treatment by the wet pack, in order not to interfere with the observation of its effects; milk diet only being allowed after the 14th May. On the 22nd May, the cream of tartar was resumed, at first in the form of electuary, so as gently and moderately to purge the bowels; afterwards (27th May) in the form of the imperial drink, without any apparent effect either upon the dropsy or upon the urine, which continued pretty steadily at 10 to 14 oz. in the twenty-four hours, with a spec. gr. 1030-36, and very highly albuminous. On the 28th May, an increase of dropsy became apparent, following a slight attack of cough, without much expectoration, and on the following day Pulv. Jalap. Co. gr. x. was ordered three

times a day, along with an increase of the cream of tartar electuary, which had the effect of purging the bowels six or seven times daily. Notwithstanding these remedies, the dropsy, especially of the abdomen, steadily increased, until on the 1st of June it appeared as though the kidneys were mechanically disabled by pressure, only 6 oz. of urine having been collected. Next day the urine could not be collected at all, and absolute suppression was feared, the dropsy still increasing. Under these circumstances paracentesis was performed, as stated in the report. After this operation quantities of urine were procured, varying once more from 10 to 15 oz., but there was no substantial improvement. It seemed inexpedient to pursue active treatment further. The patient appeared gradually to lose strength, although somewhat relieved immediately after the operation, and died 14 days afterwards, under the circumstances stated in the report.

The *post-mortem examination* was performed by Dr Foulis in my unavoidable absence, the kidneys, however, being laid aside for after-examination, which was performed, as far as possible, in presence of the clinical class. About 5 to 6 pints of a sero-purulent fluid, with white flakes floating in it, were found in the abdominal cavity—surface of intestines and parietal peritoneum of a grey colour, mottled with red; about 6 oz. of clear fluid in either pleura; a very little ($\frac{1}{2}$ oz.) in pericardium; lungs non-adherent, except at a very limited spot on left side behind; left lung crepitant throughout, highly oedematous, with some congestion of posterior part; right lung in similar condition, but more congested posteriorly; heart normal in structure, weighing $4\frac{1}{2}$ oz. when emptied of clots; right auricle, full of black clot; ventricles mostly empty, and contracted; spleen, $2\frac{3}{4}$ oz., normal; liver, 29 oz.—nothing remarkable; gall bladder not distended; brain, $3\frac{1}{2}$ lbs.; ventricles distended with clear fluid, about $1\frac{1}{2}$ to 2 oz. Kidneys, 8 oz. each, capsule easily stripped, surface smooth and generally pale, the venous polygons, however, so far traceable as to show that they preserve, in the main, their normal arrangement. In the midst of these, or on the pale non-vascular part of surface, occasional

but rare petechial-looking spots, evidently resolved by the lens into convoluted tubules containing blood. No trace of unevenness, granulations, or any change involving loss of texture, or atrophy, in any part of the surface. On section, cortical substance generally pale and yellowish (having a considerable resemblance to the well-known fourth plate of Dr Bright's great work, though less dull and opaque in tint); * cortex of good volume, and well demarcated from the pyramids, which are of a pretty deep purplish uniform colour, contrasting strongly with the cortical substance. *Arteriolæ ascendentes* have traces of blood, and appear to follow their usual course, but Malpighian glomeruli, with very few exceptions, devoid of blood, or at least so pale as to be undistinguishable by the naked eye. On examining with a lens, a few blood-coloured points observed, which resolve themselves, as on the surface, into convoluted tubes containing blood-colour. In other places convolutions are seen of a darker brown colour than the rest, or somewhat opaque, so as to be distinctly made out by the lens on the generally pale and homogeneous-looking surface of section. The survey of the sections generally, by the naked eye and lens, corroborates the impression derived from the surface, that no evidence of atrophic change exists anywhere, and that the apparent non-vascularity of the cortical substance is due to the emptying, but not the destruction of the vessels. An injection of part of the kidney further confirms this by showing that the Malpighian coils are readily filled from the arteries, and when injected display a perfectly normal arrangement, part of the injection passing also without rupture into the capillary net-work around the tubes. (Up to this point the results of the examination were recorded by Dr Gairdner in the presence and with the concurrence of Dr Joseph Coats, who continued the observations on the microscopic appearances for several days, with the following results):—

* Compare Rayer's Atlas, Pl. VI., Fig. 4. There was even, from the intense pallor and firmness, a suggestion of the waxy degeneration of the cortical substance; but the iodine test gave (as might have been expected) negative results.

Microscopic examination was made in the fresh state, and after hardening in spirit and in chromic acid. A portion of one kidney was also injected and hardened in alcohol. Examined in the fresh state the epithelium of the convoluted tubules generally was seen to have an exaggerated granular appearance, the granules being minute (cloudy swelling). In addition, there was here and there a distinct fatty degeneration of the epithelium, especially towards the deeper parts of the cortical substance (bases of the pyramids); but this fatty degeneration, though pretty frequent in single tubules, was not at all general, a very small percentage of convoluted tubules being so affected. In the pyramids there was also here and there a straight tubule, with fatty epithelium, but these also were few as compared with the mass of the tubules. In the pyramids also there was not unfrequently seen a tubule containing altered blood, in the form of a brown granular material. Tube casts were found, but in comparatively small numbers.

Sections of the kidneys made after hardening confirmed generally the results obtained from fresh sections. It was seen that the general arrangement of the tubules was practically unaltered, no prominent distortion appearing. The epithelium of the convoluted tubules retained its granular appearance, and here and there, but especially towards the bases of the pyramids, there was evident proliferation, the tubules being distended with masses of small epithelium. In the pyramids there were also straight tubules distended with altered (fatty) epithelium, in some cases so much so as to present a varicose or tortuous appearance. These tubules, however, were comparatively infrequent. No unequivocal signs of an interstitial formation were discovered. In sections of the injected portion it was seen that all the Malpighian bodies were fully injected, and that the injection-material had run past them in many cases into the capillaries.

General Remarks.—It is difficult in this case to reconcile the post-mortem appearances, and the phenomena presented by the urine on admission, with the idea of “acute des-

quamative nephritis" depending on congestion. That there may have been an appreciable amount of active congestion at the very outset is, of course, undeniable, and the rupture of a few of the Malpighian arteries may even be pleaded as proof of the fact; but how slight, how fleeting, how inadequate to account for the continued albumen in urine, appears at once from the pallor of the kidneys after death, and from the state of the urine during life. The almost total absence of blood and of epithelium in the urine within a fortnight after the accession of dropsy, which was also nearly the first symptom of a departure from the state of health, is a noteworthy fact, showing that the early stages of even the most extreme form of tubal nephritis are not necessarily attended by the shedding of the structural elements, which we are accustomed to associate with the idea of desquamation. The post-mortem examination, moreover, showed that the general proliferation of imperfect and closely-packed epithelium within the tubes, on the one hand, and the denudation of the basement membrane on the other, were equally foreign to the essence of the morbid process, which seemed rather to consist in a rather general, but slight "cloudy swelling" of the otherwise unaltered epithelium, than in any special morphological tissue-change. The progress of this towards distinctly fatty degeneration, manifested in the dead kidney in the tubes nearest the pyramids (perhaps in Henle's loops), and in the clinical history by the gradual increase of tube casts, and their change from the hyaline towards the granular type, is also well shown in the narrative of the case. The kidneys in this respect were not without some degree of resemblance to those observed in fatal cases of cholera in 1848, when Dr Borthwick, now of Dumfries, and I submitted a large number to comparative observations along with normal kidneys, and found that the most notable change was the distinctly greater tendency to the fatty degeneration of the epithelium; the scanty urine passed just after the collapse being always highly albuminous, but rarely bloody. The rapidity of the fatty change in these cases must have been much greater than in

the present case; and the very temporary nature of the renal lesion in cholera, together with the very copious evacuations by the intestinal canal, and the correspondingly increased density of the blood, are sufficient reasons for the non-occurrence of dropsy. The importance of the present case consists in the demonstration which it affords of an acute and fatally progressive form of renal disease, with comparatively slight amount of inflammatory change, but with a very large and continuous loss of the albumen of the blood, and the retention of much water, and of a considerable portion of the urinary solids* throughout the disease. A few sphygmographic observations were made by Dr Gemmell, but were inconclusive, perhaps owing to their being too long delayed; it is to be observed, however, that neither the state of the heart's sounds, nor the appearance of the ventricles after death, were such as to indicate any high degree of arterial tension. An ophthalmoscopic observation by Dr Thomas Reid was likewise all but negative in its results.

VII.—NOTES ON A CASE OF CERVICAL RIBS.

By HENRY E. CLARK, M.R.C.S., Eng., Demonstrator of Anatomy at Anderson's University.

My attention was recently called to a specimen in the dissecting room, which on close examination proved to be one of much interest, and the particulars of which I desire here to place on record.

The peculiarity which was first noticed, and which served to to attract my attention, was that the first rib of the left side was abnormally broad, having at its sternal end a width of one and a-half inches, while that on the opposite side was much narrower than usual. Moreover, the narrow right rib was at a glance seen to be on a higher level than the broad one which functionally corresponded with it on the other side, the difference seeming to be (what ultimately proved to be the case) about the thickness of one vertebra. On proceeding to count the ribs,

* Although no exact analyses were made, it is safe to assume, from the sp. gr. considered in relation to the quantity of the urine, that very little, if any, more than 300 gra. of true urinary solids in the 24 hours were discharged throughout the illness.

I was surprised to find that on the left side eleven only could be made out, while on the right the number was normal. Thinking that the broad left rib, already mentioned, might have resulted from the fusion of the two upper ones, I dissected down to its connection with the vertebral column, but found that there it was perfectly normal, and presented none but the ordinary appearances of the head and neck of a first rib. One important discovery, however, resulted from this line of investigation, for I found that, attached to the vertebra above, there was a distinct rudimentary rib. This was about an inch and a-half in length, had a well marked head and tubercle, and had complete joints with the body and transverse process of the vertebra; its extremity was smooth, but rather irregular, and it was capable of about the usual small degree of motion possessed by a first rib. It corresponded in its position to the narrow but complete first rib on the right side. This latter had an exceedingly well marked tubercle for the attachment of the scalenus anticus muscle, and on each side of this the grooves for the subclavian vein and artery were very deeply excavated, presenting in this respect a marked contrast to the broad rib on the other side, on the surface of which the grooves were scarcely distinguishable.

Thus far, my investigations had led me to the conclusion that the first rib on the left side had been arrested in its development, and that the second had consequently become increased in size, and had performed the functions of the first; but the explanation proved to be by no means so simple. When the muscles were completely removed and the vertebræ cleaned, it was found that the rudimentary rib on the left and the narrow first rib on the right, both sprung from the seventh cervical vertebra, and were therefore truly *cervical ribs*, notwithstanding that the one on the left had the anterior scalene muscle attached to it, and had resting on it the subclavian artery and vein. The first rib on the right side articulated with the upper border of the seventh cervical and the intervertebral substance between the sixth and seventh; the rudimentary one on the left with the middle of the body of the seventh, and the second rib on the right and first (functional) rib on the left with the

seventh cervical and first dorsal and the intervertebral substance between them, on each side.

The following, therefore, is a summary of what was found:—On the right side there were twelve ribs, eleven of which were dorsal and one cervical. The latter of these was complete, but was narrow and round; it performed the functions of a first rib. On the left side there were only eleven ribs, the first being much broader than usual, but otherwise presenting nothing peculiar; there was also on this side a rudimentary rib attached to the last cervical vertebra.

In consequence of the dissection having been nearly completed before my attention was drawn to the subject, the sternum and clavicle had been removed, and the lumbar vertebræ had been severed from the trunk with the lower extremities, and had been removed from the room. This was unfortunate, as I was unable to study the connections of the ribs with the sternum, or to ascertain precisely the total number of vertebræ; so that I am unable to say if there were six lumbar vertebræ, as we should naturally expect to find was the case.

Although almost all the works on anatomy mention that the number of ribs may be increased to twenty-six or diminished to twenty-two, there are actually very few cases of these variations on record. Nor are the instances of altered position of the ribs (in which category my case must, I think, be included) more numerous; indeed, I know of but one recorded case, that, namely, published by Mr Holmes Coote in the "*Medical Times and Gazette*" for January 1854. In his case the skeleton was that of a Chinese, and presented the peculiarity that the twelve ribs were attached to the twelve middle vertebræ, leaving six cervical above and six dorsal below. Mr Coote suggested that this might be the normal condition in the Chinese, but this was not substantiated by the examination of other skeletons.

The case above recorded resembles Mr Coote's, inasmuch as the ribs appear to be attached to the spine a vertebra higher than usual; but we have, added to this, the arrested development of the first rib on the left side, and the enlargement of the second, the first rib on the right side being also modified.

VIII.—A SHORT ACCOUNT OF WORK DONE IN A SUMMER COURSE OF PRACTICAL PHYSIOLOGY.

By EBEN. WATSON, M.A., M.D., *Professor of Physiology in Anderson's University, Surgeon to the Royal Infirmary, Glasgow, &c., &c.*

It may be stated without reservation and without fear of contradiction that Physiology is, for the student, the most difficult branch of the medical curriculum. The secret of this difficulty long lay concealed; but it is now well enough understood that in learning this science the student had to depend too much on a mere exercise of memory, without any assistance from the senses or judgment. To correct this error in teaching, the class of practical physiology has been lately instituted in most schools of medicine, with the view of affording an opportunity to the student of putting to his own hands and working at the subjects and verifying the facts on which the doctrines of physiology are founded.

As I have had some experience of this practical method of teaching physiology, I now intend to place before the readers of the *Glasgow Medical Journal* an illustration of the kind of work done in the class, in order that they may judge for themselves of the benefits likely to accrue to the student. I hope and believe that this will not be unwelcome at a time when attention is so generally directed to the subject in question, and when some, especially among those of the older school, still doubt the reality of the good to be derived from the class, and even speak of it as so much wasted time and energy on the part of both teachers and taught. I can, indeed, testify that the conduct of the class implies a considerable *expenditure* of energy, and I should be sorry indeed if it were all in vain; but I am fully persuaded that it is far otherwise, and that, on the contrary, the practical study of physiology is an indispensable adjuvant to the lectures, just as the practical study of anatomy and chemistry has long been acknowledged to be necessary for the right acquisition of these sciences.

I cannot avoid mentioning here, in passing, that I consider it of great importance that this practical study of physiology should be entered on early in the student's curriculum. I should

recommend it to be undertaken during the first summer session, and therefore before attending the systematic course of lectures on physiology, which ought not to be delayed beyond the second winter. The student is thus prepared for that difficult course of lectures, and is able to follow and profit by them better than he could otherwise.

In arranging the programme of work for my students in the practical class, I had the advantage of knowing by personal visitation what was being done in the same branch in various other schools, and though I was not able to cope with some of them, especially in physiological instruments and laboratory appliances, yet I have done my best to imitate them in their more important features, relying, as I had to do almost solely, on my own resources. I have, indeed, to thank the managers of the Royal Infirmary, who kindly gave me the use of rooms for the purposes of my class. I am sorry to say that these could not be obtained by me in the Andersonian building. In the rooms above referred to at the Infirmary, I had two long and firm tables, of convenient height, placed in a good light, and a certain part of one of these tables was marked off and allotted to each student. On this his microscope and other working materials were placed. For, by an arrangement with an optician, I was able to put a good easily-worked microscope into the hands of every one of my students, and along with it two objectives, one a half-inch and the other a quarter-inch. I also provided each student with slides, covers, a pipette and camel's hair brush, with the various reagents and colouring fluids in use for microscopical investigations. I only required the student to bring one or two good scalpels, forceps, scissors, a razor, and two needles set in handles, for teasing out the tissues.

The general arrangements of this, as of all such courses, were classified under the three divisions of Histology, Physiological Chemistry, and Experimental Physiology; but I explained, at the outset, that by far the largest share of time and attention would be devoted to the first division, viz., Histology; because that was the one most suited to the stage at which they had arrived in their studies, and most profitable for their future

progress. I therefore determined to make this part of the course as nearly perfect as our time would admit of, and only to take up some few examples of the other two divisions, if a fitting opportunity presented itself. I was anxious thus to avoid the danger of attempting too much in our necessarily limited time, and of falling into the mistake of slurring over subjects which deserved careful and prolonged attention.

Twenty-three students enrolled themselves in my practical class, for the summer session just finished, and that is the greatest number I have yet had in any of the three courses of the kind which I have conducted. It should here be stated that attendance on such a course in Scotland is quite optional, the ticket not being required by any of our licensing authorities. Nevertheless, it is well known that the kind of knowledge only to be acquired in the practical class of physiology is essential to passing any of the boards in Britain, and in my experience the students thoroughly agree with this requirement, and seem to be growing more and more eager to comply with it. Certain it is, that my students have attended most regularly, and, not only so, but their zeal and perseverance in working have been great and well sustained.

We met three days a week, for about an hour and a half each time, in the laboratory, but I occasionally delivered a lecture on the work done, and also on that about to be done, the object being to systematise the facts demonstrated, and to prepare for the next set of observations. We have, therefore, had during the session, twenty-two working or demonstration days, and eight lectures. Of the latter I need say nothing in this place; of the former I shall now offer a brief account almost in tabular form, after the plan adopted by Professor Rutherford in giving a similar account of his class in the *Microscopical Journal* (1872), in a very useful paper, to which I at once confess my obligations.

I have, likewise, great pleasure in acknowledging the valuable assistance given to me by several senior students, and especially by my friend Dr Carmichael. These gentlemen not only worked for me in preparing objects for demonstration, but also in the every day conduct of the class.

I.—Cells.—1. In demonstrating cells, I think the best plan is to begin with yeast—which we examined, watching its germination, and the effects of colouring fluids on its particles.

2. Next we observed the amoeba, and saw its characteristic movements, and its inclusion of solid granules placed beside it.

The nature of the cell, as being a definite portion of living matter, was pointed out; and also that the nucleus is the newest part of its substance, and the one which is most deeply coloured by solutions of carmine, magenta, &c.

8. Sections of potato were next examined, and the starch coloured with iodine.

The junction of cells in a tissue, and the differentiation of their membranes and contents were pointed out.

A.—4. Red blood corpuscles were then observed within the vessels of the web of the frog's foot.

5. Red corpuscles of the frog, newt, fowl, ox, and man were next examined on slides.

6. The effects of water on them were studied.

7. The effect of acetic acid.

8. The effect of boracic acid, and of tannin in 4 per cent. solutions.

9. The effect of carbonic acid and of oxygen alternately brought into contact with the corpuscles of the newt, in the cell of an appropriate stage.

B.—10. White corpuscles of newt's blood.

11. White corpuscles from the blood of the umbilical vein of the human foetus.

12. White corpuscles from washed clot of human blood.

The amoeboid motions of living white blood corpuscles were well observed, and the effects of acetic acid and of colouring with magenta were studied. Finally they were compared with

13. Granulation corpuscles from a clean ulcer, and

14. Pus corpuscles from an abscess.

We then passed on to the cellular tissues.

II.—Epidermic tissue, which is not a separate tissue, but only used in composition. We examined all the varieties in order, viz. :—

A.—Epithelium, consisting of moist transparent cells, obviously nucleated.

15. Tesselated epithelium, from serous and synovial membranes. Human from an amputated limb, and from skin of frog.

16. Fusiform epithelium from the lining of a blood vessel from the same.

17. Cylinder epithelium from the alimentary canal of the rabbit.

18. Ciliated epithelium from the air-passages of the same rabbit, and from the palate of the frog. Motions observed and the effects of reagents.

19. Globular epithelium, from the gastric follicles of the rabbit.

- B.—Epidermis proper, consisting of cells partly hard and reduced to scales.
20. Cuticle raised by a blister from the human subject.
 21. Hair: longitudinal view and transverse sections.
 22. Nails macerated in dilute nitric acid. Sections examined.
- III.—23. Adipose tissue, from recently amputated human foot. The nuclei were stained with carmine.
- IV.—Cartilage: Its structure and varieties, viz. :—
24. Hyaline cartilage from young kitten and from newt. In the latter the cells were seen to contract and leave the cavities of the matrix partially empty.
 25. White cartilage from adult human subject.
 26. Yellow cartilage from human epiglottis.
- V.—The fibrous tissues were next examined, as follows :—
27. White fibrous tissue, from human tendo achilles. Vertical and transverse sections were made and coloured with chloride of gold.
 28. Yellow fibrous tissue from the ligamentum nuchæ of the ox. The coarse and curling fibres were contrasted with the fine, slightly waving fibres of the preceding specimens.
 29. Areolar tissue from the umbilical cord of fœtus and from beneath the skin of the human subject, and also from the omentum of the rabbit. Acetic acid and staining were used to show that this is a mixture of the two preceding tissues.
- VI.—30. Bone was softened in dilute nitric acid and cut into sections. Its structure was then studied.
31. Ossifying cartilage from the epiphyses of newly born kittens was cut into thin sections, and the changes passed through in the process of ossification were noted.
 32. The parietal bone of a human fœtus was examined, to show the changes in the formation of bone between membranes.
 33. Preparations of bone ground upon the lapidary's stone were passed round, showing the minute structure and the bone particles.
 34. Preparations of bone with the blood-vessels injected were also passed round and examined.
- VII.—35. Teeth softened in dilute nitric acid, were cut into sections and examined—showing the structures of which teeth are composed.
36. Sections of teeth prepared by grinding, were passed round and examined.
- VIII. Muscular tissue was next examined as to its structure, varieties, &c.
- A.—37. Striated muscular fibre from flesh of ox, and of human subject, (recent.) Its fibres, fibrillæ and discs were well shown by the students.

38. The corpuscles of striated muscular fibre were shown in the fibres of the frog by means of acetic acid.
39. The sarcolemma was shown by swelling with water, and better still by twisting prepared fibre.
40. The termination of the fibre in tendon was exhibited in section of frog's muscle, hardened and coloured with chloride of gold.
41. The termination of nerve in the muscular fibre of the frog was beautifully demonstrated in two specimens.
42. The contraction of muscular fibre under the microscope, was produced by electricity.
- B.—43. Unstriated muscular fibres were taken from the intestine of the pig, and the effect of acetic acid was observed.
44. A frog's bladder was prepared, and stained with chloride of gold, and sections were exhibited to the students.
- IX.—Nerve-tissue—its varieties and their structure were studied as follows :—
45. A cranial nerve of the rabbit (recent), was teased out in salt solution, showing the fibres.
46. The cutaneous nerves of the frog were teased out and water was added to change the medulla, and exhibit the axis-fibres.
47. Human white fibres, from the medulla oblongata, hardened in spirit, were displayed; showing well the nature of the tubules, and even the sheaths, as the medulla had become quite granular.
48. Human nerve fibres were coloured with carmine and steeped in oil of turpentine, showing the axial fibres.
49. Transverse sections of the optic nerve, coloured, showed the axis fibres and the neurilemma.
50. Fresh sections of the gray matter of the calf's spinal marrow showed the nerve cells, and their connection with the nerve-tubules.
51. Coloured sections of the medulla oblongata and spinal marrow in different regions were handed round, showing nerve cells and fibres.

This completed the histological part of the course, and the short time which remained at my disposal was devoted to experiments with the Sphygmograph and on the action of the heart, with the influence of the sympathetic and pneumogastric nerves upon it. Dr Ferrier's experiments on the brain were likewise repeated with success.

During the course it will thus be seen that all the simple tissues were carefully and successfully observed and described by me, and also, afterwards, by the students

themselves from their own actual observations. The physiological experiments were equally instructive, but for obvious reasons need not be dwelt upon in this place. In conclusion, I hope that the preceding imperfect account of this practical class will prove abundantly its usefulness, and the desirability of the institution of a well equipped physiological laboratory in connection with our medical school, like those which now exist in every other medical school of any celebrity.

IX.—THE TREATMENT OF ENTERIC FEVER BY COLD BATHS.

*By M. FRANTZ GLÉNARD, interne des Hôpitaux, Lyons.**

THE starting point of Brand's treatment is a just appreciation of Enteric symptoms and their therapeutical indications. In this way Brand, while throwing the blame of all the serious complications and the fatal terminations of Enteric on the prolonged excess of the febrile temperature, shows that there can be ranged, on one side the primary and necessary symptoms proper to the manifestation of Enteric fever, pyrexia, elevation of temperature, bronchial catarrh, hypertrophy of the spleen, roseola, and various eruptions, signs which, with the exception of the temperature, are always mild, and which can neither be hindered nor extinguished by cold water; on the other side the accidental and consecutive symptoms, those dependent on the high temperature; cerebral and nervous symptoms—delirium, somnolence, coma, typhomania; serious affections of the pulmonary tissue—atelectasis, hypostasis, pneumonia, gangrene, ulcerations; intestinal lesions, fuliginosity, gastralgia, dyspepsia, intestinal catarrh, diarrhoea, tympanites, ulcerations and their consequences, hæmorrhage and perforations; the lesions which Zenker has met with in the striped muscles, which Liebermeister has studied in the liver, the spleen, kidneys and heart; the tendency to collapse, hemophilia, eschars, etc., etc., symptoms which in themselves constitute the gravity of Enteric fever, and which are never met with in patients treated by cold water. But the danger of this elevation of temperature does not consist in the simple fact of its reaching a certain height,

* Translated and condensed by Dr Wm. Macewen, from the *Lyon Medical*, 1873-74.

but in the maintenance of the temperature at a pernicious level. Even the temperature of 42° C. is not fatal if it fall soon to 39° C., but it soon becomes so if it remains long at that height; and this persistence presents the same degree of danger between 39° C. and 40° C. as between 40° C. and 41° C. This indication is then formulated: it is necessary to combat the excess of temperature during the whole course of the disease; that is to say, *to prevent exacerbations and maintain remissions.*

The first point in the treatment lies in its employment from the outset of the disease, for it is certain that refrigeration is more efficacious in preventing impending lesions than in curing them when the high temperature has produced a dissolution of the blood, or involved important organs. The phrase "from the outset" is to be understood as referring to the moment when the diagnosis of Enteric fever is certain, or as soon as the physician is called. Precious time should not be lost in using drugs, and only resorting to cold baths when the case appears urgent.

Further, there is no harm in treating by this method febrile states that have an analogy to Enteric; their evolution, in fact, is more rapid under this treatment than by the use of medicines. Only, it is necessary to guard against believing, in such a case, that cold water has arrested Enteric fever. In the Saint-Pothin ward I have seen five cases of pyrexia assuming an Enteric appearance, that were cured after eight or ten baths, and I have not hesitated to eliminate them from my statistics though the symptoms at the beginning of the disease resembled those of Enteric fever.* Even when an error in diagnosis has led to the use of the baths in such a disease as acute tuberculosis, the effects are not unfavourable to the patient.

It would be most important if severe cases of Enteric could be distinguished from mild at the outset. Those who oppose the system ask why inflict this barbarous treatment on 100 patients, of whom 80 will recover without cold water; but when this method has saved the 100, is it not culpable to refrain? There is no means of knowing that a mild case of Enteric fever may not suddenly assume a most serious aspect. It is then too late. If the form is slight, so much the better, the patient recovers the sooner; if it is serious the recovery is certain, provided it is treated from the

* In the observations on which my statistics are founded there is not a single patient who has taken less than 40 baths, and not one but presented during the first five days a minimum temperature of 40 degrees before the bath.

outset. If the treatment is applied later it is necessary to distinguish two categories: the first comprises cases which are submitted to cold water on account of the gravity of the type, and the insufficiency of the medicines: the second comprises serious cases in which grave complications have supervened. Of the first class the greatest number recover. Of the second it happens that a life is lost here and there from lesions which are necessarily fatal.* It is not uncommon to have recourse to this treatment with a moribund patient; but Brand's method is not more efficacious than drugs against death.

The least important objections against this treatment are *difficulty* and *barbarity*. In civil hospitals the first question has long since been decided by the use of the baths in the practice of German physicians. In the Hotel-Dieu at Lyons the directorate of the Hospital have arranged, in view of facilitating Brand's method, two wards for Enteric patients, one for female, the other for male. The eleven cases treated in these wards up to this day have resulted in eleven recoveries. At the Croix Rousse Hospital the thirteen cases treated since mine have given thirteen recoveries.

In private practice, it is said, evidently without reflection, that the method is quite unsuited, as if the mere matter of convenience should present itself before that of the life of the patient. But here there is no difficulty; as I will show, further on, seventeen cases treated by cold baths in private practice resulting in seventeen recoveries.

Lastly, when everything has been considered, and it is agreed that the method is practicable, then the plea of its barbarity is advanced. This looks like the result of exaggerated sensibility, or want of consideration on the part of the physician. But even should the treatment appear barbarous (and it will be shown that it is not), is all that accrues therefrom to be considered worthless; the certainty of the prognosis, the rapidity of the convalescence (three or twelve days in place of thirty or forty), the freedom from sloughs, and the sequent weakness of the intellect or the senses, the allaying of all anxiety on the part of the family or the physician? The physician cognisant of the treatment knows what power he has; and the family who see the patient rise on the third day to bathe himself, crying for food, serving himself, assisting in the change of his compress, &c., sleeping calmly, and, in a word, assuming the appearance of health, judge for themselves of the prognosis, and are satisfied.

* Zur Hydrotherapie des Typhus.

But in order to speak authoritatively to a family, it is necessary that the physician should be convinced; and so I find myself again at my starting point. It is time, therefore, to reply to incredulity by facts. I will dwell only on the most important, on those which seem most instructive and most fertile in deductions, and all useless matter will be left out.

First, I wish to remove from Brand's method the blame of the fatal case of which I have elsewhere spoken, and to give proofs which I hope will be satisfactory to the most fastidious that there has been no concocting of statistics to bring about this result.

(Croix Rousse Hospital, Saint-Pothin Ward, bed 43, under the care of Dr Faivre).—Tissot, 18 years of age, admitted on the 16th August and died on the 3rd September. Duration of disease on admission, 25 days; length of residence, 18 days; length of treatment, 18 days; 43 baths. Deferrescence from the third day, after 25 baths. Duration of illness, 43 days. Death.

This patient, previously very debilitated, of a scrofulous constitution, with tubercular antecedents, was submitted to the cold bath treatment on his admission, on the 25th day of his illness. During the first three hours of his residence the rectal temperature varied from 41° to 41.5° .

August 17th, at 7 a.m.—Rectal temperature 41.5° ; at 10 a.m., 41.3° . First bath.

20th.—The temperature oscillated between 40° and 40.5° .

23rd.—The temperature ranged, since the 20th inst., between 39.9° and 37.4° . Brandy prescribed.

25th.—Temperature, 39.8° to 38.3° . Diarrhoea profuse. Cold compresses ordered.

27th.—Temperature from 39.9° to 36.4° ; progressive adynamia. Tonic spasms and contractions of the upper limbs. Extract of quinine grs. 4; sherry 100 grammes.

29th.—Temperature, 39.4° to 36.8° . Paralysis of the sphincters. Baths of five minutes.

31st.—Temperature, 39.2° to 37.2° . Contractions of all the limbs.

September 1st.—Temperature at 7 p.m., 41.7° .

2nd.—Temperature, 39.7° to 37.3° .

3rd.—Temperature at 4 a.m., 38.5° . At 8 o'clock a.m. death occurred without pain or premonitory symptom.

Post mortem examination on 4th September, at mid-day, 28 hours after death. I pass at once to the intestinal lesions, with which we are at present chiefly interested.

The small intestine showed the usual lesions of Enteric fever in the ulcerative stage. The cæcal mucous membrane is uniformly altered so as to exhibit a rugous surface with cauliflower granulations (or presenting an appearance like new-mown grass), studded with a great many hypertrophied granulations, partly mixed with gray ulcerations filled with a gray or yellowish-black pigment. These ulcerations cover both sides of the valve of Bauhin, and extend without demarcation to a distance of 0·13 centim. over the whole circumference of the walls of the large intestine. Passing from this point to the anus, the large intestine is riddled with erosions about the size of a bean, irregular in shape, at first slightly tortuous and separated from one another by a distance of from 10 to 11 millim. at the most, but diminishing as the end of the bowel is approached. The mesenteric glands are hard, homogeneous, and little tumified. The spleen is of normal size and healthy appearance, weighing 190 grs.; on section it "cries under the knife," and offers resistance, like hepatized tissue. The other organs are perfectly healthy to the naked eye. (Spinal cord, brain, lungs, heart, &c.)

Dr Leudet (*Compendium de Médecine Pratique*) says:—"The development of ulcerations in the large intestine occurs frequently in the course of typhoid fever. These ulcerations always manifest themselves in the case of slow convalescence, accompanied by prolonged diarrhœa and prostration of strength; the most pronounced are observed in patients dying from the 50th to the 60th day of the disease. . . . The rarity of serious changes in the large intestine among patients who succumb at an early period of the disease is well known."

The patient had already passed through a period of 25 days of fever before treatment. Since the post mortem examination after 18 days' treatment presented lesions that are met with from the 50th to the 59th day of the malady, it is also necessary to establish that the method has not been injurious to this patient. If we look at the history, we see that while the temperature oscillated between 41° and 41·5° during the first 24 hours after his admission into the hospital, and before his first bath, it fell in three days (25 baths) as low as 40°, which was not surpassed during 16 days. I do not wish to say that we uphold that the life of this patient was prolonged for 16 days, but all know the gravity of the persistence of a temperature above 41° at the 25th day of a disease so injurious to nutrition as that of typhoid fever not treated by cold baths.

I now proceed to treat of the results obtained by Brand's method at Lyons. Except in four or five cases, I will give in a few words only, the observations made there; following as nearly as possible the chronological order, commencing, consequently, with my own. They were treated in the Croix Rousse Hospital.

Obs. I.—(Saint-Pothin Ward, under the care of Dr Faivre, bed No. 18) Curtil, 17 years of age, admitted on the 3d July, 1873, dismissed on the 5th August. Duration of residence, 33 days. *Adynamic typhoid fever* commenced seven days before the first bath. Duration of treatment, 12 days; 69 baths. Defervescence on the sixth day, after 47 baths. Duration of the disease, 21 days; of the convalescence, 12 days—cured.

Obs. II.—(The same, No. 43) Lucrot, 25 years of age, from 5th July to 13th August; residence, 39 days. *Very serious adynamic form of the disease*; commencement, 14 days before first bath. Duration of treatment, 21 days; 157 baths. Defervescence slow, after 11 days and 86 baths. Duration of disease, 45 days; of convalescence, eight days—cured.

I may remark that it was necessary to compete with the disease in this patient for 11 days before defervescence took place. The first bath was given on the 14th day of the disease, after he was six hours in the hospital. At that time Brand's method was not sufficiently believed in by my hospital assistant, as he hesitated in serious cases where it appeared that the organic reaction was too feeble to overcome the effects of the cold bath. The result of this case has justified both my perseverance in the treatment and the determination of Dr Faivre to carry it out, though he considered the prognosis as fatal; but who, after seeing the success, became the most convinced promoter of the method. During the first six days the patient suffered from epistaxis, which became more and more profuse (till the last day it amounted to two basinfuls), for the relief of which internal hæmostatics were administered without effect. It disappeared after the first bath.

Obs. III.—(The same, No. 22) Chabert, 28 years of age, 22d July to the 12th August; duration of residence, 22 days; commenced nine days previously; duration of treatment, 13 days, 89 baths; defervescence on the fifth day, after 30 baths; duration of disease, 22 days; of convalescence, nine days—cured.

The patient was of a scrofulous constitution, showing cicatrices on the neck; the right elbow deformed, ankylosed,

and bore traces of old fistulous openings from diseased bone. The *tumeur blanche*, far from being a contra-indication to the use of baths, appears, from the cases observed, to be ameliorated under its use.*

Obs. IV.—(The same, No. 48) Lauvergne, 18 years of age, from 8th July to the 2d August; length of residence, 25 days; commencement of disease, eight days previously; duration of treatment, 13 days; 75 baths; defervescence on the 10th day, after 61 baths; duration of the disease, 21 days; of convalescence, 12 days—cured.

Obs. V.—(The same, No. 10) Péronze, 23 years, from 12th July to 11th August; duration of residence, 30 days, having been seven days ill before admission; length of treatment, nine days, 46 baths; the period of cooling commenced sharp on the seventh day, after 40 baths; duration of the disease, 16 days; of the convalescence, 21 days—cured.

In this case the spleen was very much enlarged, being at first perceptible to palpation, and then to percussion on the tenth day of treatment. During the course of the disease he asked for his baths, and did not wish to stop them even after they could be dispensed with as a point of treatment.

Obs. VI.—(The same, No. 47.) Pierre Perrin, 20 years of age; from 29th July to 23rd August; length of residence, 25 days, the commencement of disease dating three days previously. Length of treatment, 18 days; 113 baths; defervescence on the fifth day, after 35 baths; duration of disease, 21 days; of convalescence, seven days—cured.

This is the patient whose thermometric curve appears in the *Lyon Medical* of 28th September, 1873: it is interesting from several aspects. He was nurse of the Saint-Pothin Ward, and when he knew that he was going to have typhoid fever he asked to be placed under our care, knowing the treatment followed for the cure of his disease. Although submitted to the treatment on the third day of the disease, the fever followed its course very regularly during 21 days; only the defervescence commenced much sooner (on the eighth day of the disease, the fifth of treatment), and he was convinced on the fifth day by his own experience that he was recovering.

There was also an old gray-headed waiter, aged fifty-three years, who was submitted to the refrigeration by his own request in the Saint-Nizier ward, (under the care of Dr Français) but he had catarrh and emphysema, and it was

* From the fourth day (25 baths) the patient asked and obtained leave to smoke during his bath!

necessary to stop the treatment after he had had six baths, on account of a suffocating paroxysm which ensued when coming in contact with the cold water.* Was this, then, a contra-indication? The case is clear: the patient was fifty-four years of age, laboured under chronic catarrh, emphysema, and asthma, he took Enteric fever, was treated by baths, and finally recovered without aggravation of the thoracic symptoms, and without these having caused the slightest interruption in the treatment.

It is always necessary, out of consideration to the thoracic symptoms, to diminish the shock produced by the baths (baths gradually made cold; baths hotter and more prolonged),† and their numbers to be regulated to a certain degree, according to the feelings of the patient. Still they are not contra-indications.

Obs. VII. (The same, No. 19).—Revoil, seventeen years old. From the 16th August to the 27th September: duration of residence, 46 days; beginning of disease, 6 days previously. Length of treatment, 44 days. 199 baths; defervescence very slow from the ninth day, after 56 baths; duration of disease, 50 days; of the convalescence, 2 days—cured.

Alimentary excesses failed to compromise the success; all went well save the temperature, when we made the discovery that the patient had stolen bread from his neighbours, even out of another ward; the length of defervescence took the place of a convalescence.

Obs. VIII.—(The same, No. 45.) Dallesandri, 17 years of age. From the 10th August to the 30th September; duration of residence, 37 days; adynamic form; commence-

* This patient is now perfectly well. As six baths only were administered, and as he had other treatment following these, I cannot reckon the case in my statistics.

† But it is well to say, *à propos* of tepid baths, that they are much more fatiguing for the patient; he complains less, in fact, of the bath itself than of its duration. He feels very well during the first ten minutes; but from the time when the shivering commences, it is necessary to develop a true talent of persuasion to make him yield with good grace to its full length; but the tepid bath, which ought to be made cold in order to be efficacious, requires nearly double the duration of the simple cold bath. I am allowed to state, with regard to this, that Brand's children much preferred a cold bath of short duration to a warmer one much prolonged. Besides this inconvenience, the tepid baths (the method of Ziemssen) have that of requiring greater quantities of water (every three hours), and they are really less efficacious, judging at least from the statistics of Leube, Ziemssen's pupil, which give more than quadruple the mortality of Brand's method—19 in place of 4.5 per 100 (I speak of the gross statistics, in which all are included without reckoning the date of commencement).

ment, 8 days previously. Duration of treatment, 34 days; 150 baths; defervescence, from the first day; then from the ninth to the 21st day a gradual increase, which attained its maximum at 40, and then true defervescence set in, and lasted for 15 days. Duration of disease, 42 days; of convalescence, 7 days—cured.

Alimentary excesses failed to be more serious in this case than with the preceding. This is the only case in which we found the temperature to rise to 40° after a first defervescence. During the period of abnormal ascension there was intense tympanitis, diarrhoea (symptoms of a second intestinal suppuration), and that iliac hyperesthesia of which I have spoken. The true defervescence was marked by an eruption of confluent boils over the sacrum.

Obs. IX.—(The same, No. 42.) Moreau, 20 years; from 17th August to 8th September; duration of residence, 20 days; admitted on the ninth day of the fever. Length of treatment, 12 days; 58 baths; defervescence gradual from the first day. Duration of the disease, 21 days; of the convalescence, 7 days—cured.

Obs. X.—(The same, No. 50.) Darchine, six years; from the 18th August to the 26th September; length of residence, 35 days. *Serious ataxo-dynamic form*; commencement 4 days, after 11 days of *prodromes*. Duration of treatment, 26 days; 139 baths; defervescence set in freely on the 18th day, after 124 baths; it lasted 9 days. Duration of the disease, 30 days; of the convalescence, 9 days—cured.

This patient had such violent delirium on admission as to keep the ward in continual disturbance during the night. His face was painful to look at, expressing the utmost anxiety and grief. He came out of bed, but to fall powerless on the floor. His face was cyanotic and marbled; the lungs engorged from being affected with severe catarrh.

The shock of the first bath was great; it was necessary to hold the patient in the water in spite of his frightful cries, by energetic pressure on the shoulders, and by holding his lower limbs. After seven minutes' struggle he became quiet, completed his bath without complaining, and from that time the cerebral symptoms disappeared, and did not return. The treatment produced this without inconvenience; the effect of the baths never failed, and the patient was the first to ask for them, knowing the relief they gave. It is useless to add that the thoracic symptoms were relieved (cold compresses), and gradually decreased, as I have formerly indicated.

Obs. XI.—(The same, No. 14.) Doux, 24 years; from 12th September to the 11th October; duration of residence, 29 days; entered on the 9th day of the disease. Length of treatment, 27 days; 154 baths. Duration of fever, 36 days; of convalescence 2 days—cured.

This lingering case showed nothing remarkable; the pulmonary apices were suspected, but there was no positive sign; bronchitis trifling. The severe headache and pain in the neck, which prevented all movement, disappeared rapidly after two or three baths. On the 18th day of treatment the patient obtained leave to rise, with the express recommendation not to sit, but to walk all the time, till he felt tired, and then to go to bed; to lie down at least every three hours, so as to have his temperature taken, and to go to his bath if necessary. He acted thus during nine days.

Obs. XII.—(The same, No. 48.) Lapalud, 26 years; from 13th September to 7th October; length of residence, 24 days. *Grave ataxic form*; commencing 6 days previously. Duration of treatment, 18 days; 120 baths; defervescence on the 8th day, after 72 baths. Duration of disease, 23 days; of convalescence, 1 day—cured.

He exhibited during defervescence a very confluent eruption of boils, and several abscesses under the skin of the hand. He is the only one of our patients who was attacked with alopecia.

Obs. XIII.—(The same, No. 45.) Pont, 24 years; from the 2nd October to the 5th November; duration of residence, 34 days. Very grave adynamic form; in the fourth day of the disease. Length of treatment, 23 days; 101 baths; defervescence very slow, barely appreciable, but regular from the third day, after 8 baths. Duration of disease, 27 days; of the convalescence, 11 days—cured.

Defervescence was obtained rapidly in this case, treated from the fourth day of the disease; but the normal duration of the disease was not shortened.

Obs. XIV.—(Saint Irenée Ward, in charge of Dr Soulier, No. 44.) Chateaur, 26 years of age, admitted 22nd August, dismissed 21st September. Length of residence, 30 days, disease having commenced three days previously. Duration of treatment 21 days; 98 baths; defervescence on the 6th day, after 43 baths. Duration of disease, 24 days; of convalescence, 9 days—cured.

Obs. XV.—(The same, No. 49.) Poupée, 18 years; admitted 28th August, dismissed 15th September. Length of residence, 18 days; disease at its eighth day on admission.

Length of treatment, 8 days; 55 baths; defervescence on the third day, after 10 baths. The disease lasted 16 days; the convalescence 10 days—recovered.

Obs. XVI.—(The same. Note by M. Bourquet, *interne du service*. No. 13.) Similion, 23 years; 1st December to 31st December. Length of residence, 30 days. *Grave adynamic form*; commenced 8 days previously. Length of treatment, 18 days; 75 baths; defervescence on the 6th day, after 35 baths. Duration of disease, 26 days; of convalescence, 13 days—cured.

Obs. XVII.—(The same, No. 40.) Guillot, 22 years. From the 8th to the 22nd December. Length of residence, 14 days. Mild form. Admitted on the 9th day of disease. Length of treatment, 8 days; 30 baths. (After the fourth day of treatment the baths were given only when the temperature was above 39 degrees.) Defervescence on the first day; length of disease, 17 days; of convalescence, 4 days—recovered.

Obs. XVIII.—(Saint Mizier Ward, under care of Dr Français.) Court, 18 years. Admitted on the 15th of October, on the 9th day of disease; dismissed on the 5th November. Length of residence, 20 days, and length of treatment 11 days; 54 baths; defervescence gradual from the third day, after 12 baths. Duration of disease, 2 days; of convalescence, 9 days—cured.

Obs. XIX.—(The same, No. 17.) Pigeon, 33 years. Admitted 16th October, on 7th day of disease. Dismissed 7th November. Length of residence, 21 days. Length of treatment, 11 days; 71 baths. Duration of disease, 20 days; of convalescence, 10 days—recovered.

Obs. XX.—(The same, by M. Albert.) Girdoux, 18 years. Admitted 12th November, on the 5th day of illness. Dismissed on the 12th December. Length of residence, 31 days. Length of disease, 27 days; of convalescence, 8 days—recovered.

Obs. XXI.—(The same, Saint Blandine Ward, under Dr. Français—Dr. Schaak acting in absence.) Marie Guillot, 23 years; from 19th September to 28th October. Length of residence, 42 days. *Very grave ataxo adynamic type*. Commenced 13 days previously, after 10 days of *prodromes*. Length of treatment, 18 days; 120 baths; defervescence on the 13th day after 92 baths. Duration of disease, 31 days; of convalescence, 18 days—recovered.

The following is her history, in a few words:—

Menstruated regularly since 15 years of age; hysterical;

menses retarded for fifteen days. From the 16th to the 22nd September—the day on which she was treated by the cold baths—the following symptoms were observed: intense headache, hyperæsthesia, careworn expression, hallucinations, diarrhoea, frequent vomiting. Pulse from 100 to 120. Temperature axilla varying between 39°8 C. and 40° C. On the 19th September, rose papules, borborygmus, delirium. On the 20th and 21st, delirious, *fuliginosities*, ataxia. The patient refused all nourishment, and would not drink.

September 22nd.—Treated by Brand's method. After the second bath the ataxia disappeared, but deep adynamia then showed itself, and the patient assumed a comatose aspect.

24th.—Syncope in the bath. No interruption in the treatment.

25th.—Appetite.

27th.—General state satisfactory.

Entérorrhagie took place twice, once in the bath, the second time two hours after. T. R. 40·5°. Ice compresses on the abdomen. Baths continued.

October 1st, and the following days.—Better. Hunger. The temperature up till the 4th October about 40° but after this date gradually sank. On the 6th and 7th the patient only took four baths.

8th.—Appetite vigorous: animal food.

9th.—Baths discontinued. Abscess under the epidermis.

10th and following days.—Her general state continues excellent, the abscesses following their ordinary course, producing a regular ascending curve on the thermic line, the highest point being 39°7, which it reached in 7 days, and gradually fell during the next five days.

22nd.—Perfect health, though weak. At this time there was not the least trace of slough.

This case shows that, in order to carry out the method, faith in the treatment is required. After some hesitancy the treatment was commenced on the 13th day of the illness. The adynamic form was masqued by the ataxia during the first few days, but the baths quickly dispelling it the adynamia appeared. If attention had not been paid to this it might be supposed that the adynamia had been the result of the baths. During the nineteenth bath, at midnight (on the fifteenth day of the disease) she had *syncope* in the bath: frictions, ether, and other restoratives quickly recovered her. Three hours after the temperature was 40·2°.

Considering, as Brand does, that syncope is an accident without consequences to be compared to the excess of temperature, I caused the patient to be again put in the bath in my presence, after having given her a mouthful of wine. The temperature of the water was as usual 20° ; the cold affusion on the head was continued; the patient being energetically shampooed, and her mind constantly kept active. This accident did not occur again. Brand has never met with this symptom, which he ascribes to waxy degeneration of the cardiac muscle, due to the continued excess of the temperature, and which he does not believe would ensue if his treatment were applied from the outset of the disease. In the most advanced stage of the disease, and with extremely weak patients, Brand advised that one or two tablespoonfuls of good wine should be given before each bath, and all fear would thus be allayed. Otherwise it is necessary to suspend the treatment in cases of collapse, syncope, lipothemia, etc. Symptoms of cardiac myositis are independent of the bath, and constitute a serious prognosis. But there would be little use trying this treatment if the physician were to distrust its efficacy and give it up in every serious case, or at every threatening symptom: this would be no advance over drugs. *Enterorrhagia* is to be considered as an undoubted complication, although Trousseau, and before him Kennedy and Graves, regarded it as a favourable crisis. It must be presumed that this complication never would have appeared if the patient had been submitted to the cold baths from the outset, as Brand never observed it in any of his patients treated from the beginning of the disease: in the second place, its occurrence is at variance with Brand's method generally; for under this treatment the intestinal lesions which produce hæmorrhage do not occur or do not attain the ulcerative period: in the third place the dyscrasia of the blood had been allowed to proceed too long unchecked.

Obs. XXII.—(The same, in charge of Dr Français) Marie Bérard, 17 years, admitted on 19th September, on the eight days' illness; dismissed 21st October; length of residence, 23 days; severe type. Length of treatment, 22 days; 120 baths; defervescence on the sixth day, after 26 baths. Duration of the disease, 33 days; of the convalescence, seven days—recovered.

Obs. XXIII.—(The same.) Marie Poulat, 16 years, entered on the 17th November, on the tenth day of the disease, dismissed 11th September; length of residence, 30

days. Length of treatment, 20 days; 88 baths. Duration of the disease, 31 days; of convalescence, nine days—recovered.

Dr Faivre saw this patient in town, and gave a fatal prognosis, but tried the cold water as a last hope. She suffered so much from sore throat that the previous physician had treated her for diphtheria. The angina and the dysphagia (the patient could take nothing) disappeared after the third bath.

Obs. XXIV.—(Hôtel-Dieu, Saint Martin Ward, under Dr Chavaunes.) Auguste Laurient, 19 years, from the 25th October to the 25th December; length of residence, 41 days; commenced eight days previous to admission; grave adynamic form. Length of treatment, 26 days; 207 baths; alimentary excess produced a relapse, followed by a second defervescence, the same as in observation VIII. Duration of disease, 34 days; of convalescence, 13 days—recovered.

Obs. XXV.—(The same, No. 2.) Cl. Magnard, 20 years, from 25th October to 19th November; length of residence, 25 days; admitted on the thirteenth day of disease. Length of treatment, 11 days; 84 baths. Duration of disease, 24 days; of convalescence, eight days—recovered.

Obs. XXVI.—(The same, No. 1.) Borimo, 20 years, from the 27th October to the 19th November; length of residence, 23 days, from the eighth day of disease. Length of treatment, 18 days; 108 baths; defervescence on the fifth day, after 33 baths. Duration of disease, 26 days; of convalescence, five days—recovered.

Obs. XXVII.—(The same observation by M. Chaudelux.) Bordonni, 17 years, from the 16th November to the 9th December; length of residence, 23 days; *very serious adynamic form*, commencing four days previous to admission. Length of treatment, 20 days; 139 baths; defervescence on the seventeenth day, after 104 baths (alimentary excesses.) Duration of disease, 24 days; convalescence retarded.

Obs. XXVIII.—(The same, No. 23.) H. Bonnet, 38 years, from the 4th to the 9th November; length of residence, 15 days; commenced 14 days previously; *ataxic type*. Length of treatment, four days; 16 baths; the temperature did not pass 40 deg. (this patient does not appear in my statistics); length of disease, 18 days; of convalescence, 11 days—recovered.

Obs. XXIX.—(The same, No. 1.) Lauce, 17 years, from 23d November to the 8th December; length of residence, 15 days; commenced 10 days previously. Treatment lasted

10 days ; 61 baths ; defervescence on the fourth day, after 31 baths. Duration of disease, 20 days ; of convalescence, five days—recovered.

Obs. XXX.—(The same, No. 23.) Zaccone, 21 years, from 25th November to the 9th December ; length of residence, 14 days ; disease commenced six days previous to admission. Duration of treatment, which was incomplete (this patient will not be counted in the statistics), six days ; 14 baths ; defervescence on the third day, after eight baths. Duration of disease, 12 days ; of convalescence, eight days—recovered.

A very painful sciatica, which the patient evidently exaggerated, so that he might escape the baths, showed itself, and caused M. Chavannes to limit the number of the baths ; otherwise the fever was mild, and the sciatica was not increased by the baths.

Obs. XXXI.—(Sainte Jeanne Ward, under the care of Dr Boucaud.) Elis. Humbert, 18 years, from the 2nd November to the 15th November ; admitted on the 9th day of disease ; duration of residence, 13 days ; adynamic type. Length of treatment, six days ; 23 baths ; defervescence sharp on the fifth day, after 21 baths ; duration of disease, 15 days ; of convalescence, seven days—cured.

Obs. XXXII.—(The same.) Jeanne Perret, 15 years, from the 18th November to the 10th December ; admitted on the fifth day of disease ; length of residence, 22 days. Duration of treatment, 14 days ; 92 baths ; defervescence on the eleventh day, after 61 baths. Duration of the disease, 19 days ; of convalescence, eight days—cured.

Obs. XXXIII.—(The same obs., by M. Tédénat.) Thérèse Dermomsey, 24 years, from 27th November to 31st December ; admitted on the eighth day of disease. Length of treatment, 22 days ; 103 baths ; defervescence on the fourth day, after 24 baths. On the tenth day on account of alimentary excesses the defervescence was interrupted by a rise in the temperature, and the symptoms pointed to peritonitis. The baths were continued, and six days after everything came right. Duration of disease, 30 days—cured.

Obs. XXXIV.—(Sainte-Jeanne Ward, Dr Maget.) Claude Cornet, 24 years, from the 13th December to the 11th January ; duration of residence, 35 days. The treatment was applied on the 24th January, on the eighteenth day of the disease. Length of treatment, nine days ; 40 baths ; defervescence on the seventh day ; length of disease, 27 days ; of convalescence, eight days—cured.

The fever presented a normal march during the two first septenaries; but the temperature was maintained at a high level (as high as 40°), and the eighteenth day it reached 41° , when M. Maget, fearing a complication, did not hesitate to employ the cold baths. It is difficult to state what might have happened to the patient if the baths had not been used. However, it is just to consider that, notwithstanding their employment, the rectal temperature reached 40° previous to the twenty-third bath; but thanks to the baths the symptoms were not increased.*

Obs. XXXV.—(Croix-Rousse Hospital, under the care of Dr Faivre, No. 48.) Cochin, 21 years, formerly patient in the hospital, from the 15th to the 20th September, 1873, when he was treated for a chronic *cachezie paludéenne* with considerable hypertrophy of the spleen. He was readmitted on 15th October, 1873, with ataxo-adyynamic Enteric fever of four days' duration (the spleen was still perceptible to palpation in the neighbourhood of the umbilicus). Three days afterwards he was treated by the baths—the disease being then in its seventh day. The treatment lasted 42 days; 114 baths; defervescence took place on the ninth day, after 71 baths. Duration of disease, 50 days; convalescence very much prolonged—cured.

Obs. XXXVI.—(The same, No. 16.) N——, 15 years, admitted on 9th January, on the ninth day of the disease. *Serious ataxo-adyynamic type*. Length of treatment, 20 days; 48 baths; defervescence on the second day, after five baths. Duration of disease, 29 days—cured. A critical exanthemata appeared in the shape of *furunculus anthracoides* in the axilla.

BRAND'S METHOD IN PRIVATE PRACTICE.

Obs. XXXVII.—(Patient of Dr Faivre.) M. Nons. On the eighth day of disease; length of treatment, 112 baths. Length of disease, 21 days; of convalescence, 2 days—cured.

* Subsequently to the period embraced in this paper three patients treated *à la Brand* died. The author gives the following facts in proof of the imperfect application of the method:—The treatment was confided without control to a nurse—a very significant fact for anyone acquainted with hospitals—moreover, to a nurse quite convinced, according to *her experience* (!), that the lives of the patients would be hazarded in submitting them to a *homicidal experimentation* (!), and who charitably warned the patients on admission of the danger they would undergo, and so awakened in them an easily understood fear, which, when joined to the thousand excuses invented by her, gives an idea of the manner in which the doctor's orders were attended to. Moreover, there was no *post mortem* examination of these cases; and the author mentions that in two instances of supposed death after treatment by baths, miliary tuberculosis was discovered on examination of the body.

The day after the one on which the patient took his last bath (the rectal temperature did not reach 38.5°) he took an hour's walk in the open-air, and felt very little fatigued thereby. The progress of the disease was very regular; the baths were given very simply. The mother of the young man strictly superintended the baths during the day, encouraging her son, and did not yield to the ravenous appetite which he exhibited. During the night the services of an old military nurse were procured, and consequently everything was punctually attended to.

Obs. XXXVIII.—(Private patient of Dr R. Tripier.) Mlle. N—, 16 years. From the 8th to the 27th November. *Very grave ataxo-adyynamic type.* Seen first on the twelfth day of the disease. Length of treatment, 11 days; 51 baths. Duration of disease, 22 days; of convalescence, 7 days—cured.

The following are the observations of Dr Tripier on the case:—"The patient showed, during two days previous to the first bath (the eleventh and twelfth days of the disease) the most grave ataxo-adydynamic type of Enteric, one of these types which are generally regarded as fatal, the exceptional recoveries from which are marked by severe complications. But here there was not a trace of complication. After each bath, the amelioration was so marked that it was even noticed by the family. After the third bath the patient went with a little support to her bath, placed in the adjoining room. The first twenty or twenty-one baths the patient liked well; but after that, especially towards termination of the defervescence, the treatment became fatiguing, and when the baths were much more difficult to bear, the family, instead of placing any hindrance in the way of their administration encouraged the patient to persevere with them." In consequence of this observation and its agreement with similar facts already established, Dr Tripier concludes that the physician has no choice in the treatment of Enteric, and as far as he is concerned, he is determined to leave any Enteric patient who does not submit to the cold baths.

Obs. XXXIX.—(Observations of Dr Charpy.) M. N—, medical student, 20 years. Seen on the 13th day of the fever. Suffering under a *serious adynamic type.* Length of treatment, 18 days (29th November to the 27th December); 97 baths; defervescence on the sixth day, after 29 baths. Duration of disease, 31 days; of convalescence, 9 days—cured.

The treatment, commenced only on the thirteenth day of

the disease, was too late to prevent the appearance of an intestinal lesion, as indicated by the symptoms. On the third day of the treatment, notwithstanding the baths, the prognosis, hitherto favourable, became desperate, and if Brand's method had been applied later, death would have been the result. The cold baths were accepted by the family as soon as proposed. Cold compresses were applied on the abdomen, head, and thorax, and by the patient's own request iced water was given him to drink. The baths were easily arranged, even though the water had to be carried from the outside of the house. The patient never had a stool in the bath, so the water was only changed once every twenty-four hours, a pot of boiling water being added to it before each bath.

Obs. XL.—(Private patient of Dr Montvenoux; notes by Dr Poulett.) J. B. Prudd, 13 years. Seen on the eighth day of disease, October, 1873. 35 baths were administered; defervescence on the third day, after 24 baths; on the eighth day the patient only took three or four baths. He was allowed out-door exercise on the twentieth day from the first bath—cured.

Obs. XLI.—(Private patient of Dr. Dupuy, d' Oullins.) Mdlle de R—, 13 years. Seen on the third day of disease. Treated during six days by cold compresses, and the next ten days by the baths. Duration of disease, 19 days; convalescence very short—cured.

With this patient, although the cold sheets were renewed every *three minutes, day and night, for six days*, yet the axillary temperature, on the sixth day, was 40.8° , and the cold baths were applied instead. This observation of M. Dupuy's is important, as it shows how insufficient the cold compresses are even when changed every three minutes. It is true that the general symptoms amended under their use; but such a course would be unsuited for most cases, as it is only a mother who would be capable of such devotion as this girl got; in hospital it would be quite impracticable. But Dr Dupuy found a more serious inconvenience in the patient never being left a moment for sleep on account of the incessant change of the compresses, while with our cold baths the Enteric patient enjoyed three hours rest at least, and slept well in the interval between the baths—in a refrigerated condition; but the regular employment of cold compresses is useful in general at the outset of the disease, and in very serious cases, as it then no longer acts in lowering the temperature of the blood, but in main-

taining the effects of the baths, and struggling against the local symptoms (diarrhoea, bronchitis, delirium), and in preventing their progression: to attain that end it is sufficient to change them every quarter of an hour.

Obs. XLII.—(The same.) M. N——, 20 years. Seen on the eighth day. Labouring under *an ataro-adyamic type*. Cold compresses during four days; cold baths used during the six days following. Duration of disease, 18 days; of convalescence, 8 days—cured.

The delirium, which persisted in spite of the employment of the cold compresses, disappeared after the first bath.

Obs. XLIII.—(Private patient of Dr Michel Rondet, of Mirifel.) Marie M——, 8 years; seen on the 6th day of the disease; from the 9th October to the 29th of the same month. Treatment continued for 12 days (16th to 28th October); length of the disease, 22 days; of convalescence, 8 days—cured.

Obs. XLIV.—(The same.) Jandean, 32 years, tall and stout (weighing 100 kil.); two previous attacks of articular rheumatic ague; heart not affected. Serious type. Seen the 5th day of disease. Length of treatment, which was interrupted from the third day, on account of syncope produced in the bath, two days; 16 baths; defervescence on the 9th day of the disease. Duration of disease, 24 days; *length of convalescence, four weeks*—cured.

The remarkable point in this observation was the faulty action of the bath, which should have lowered the temperature; but although the water was at 20°, and the duration of the bath 15 minutes, there was an elevation of 0·4° on the temperature taken before the bath, and the thermometric observation had been made by Dr Rondet himself. If the baths do not produce refrigeration it is because they are not sufficiently cold, sufficiently prolonged, or sufficiently often, and there is no fear in ordering them, for example, at 17° for 20 minutes' duration every two hours. *If the letter of the method indicates the giving of the baths, its spirit indicates refrigeration.* Syncope came on during the sixth bath, but it was trivial, as it had passed off before the doctor came, a quarter of an hour after, and he only knew of it from the family. The Enteric symptoms (delirium, dryness of the tongue, &c.), scarcely altered by the treatment, were heightened after the baths were stopped. It is also necessary to consider that the convalescence was of four weeks' duration, instead of eight or twelve days.

Epidemic at Curis, near Lyons.

Obs XLV.—(Private patient of Dr Rondet, of Neuville-sur-Saône.) A child of $3\frac{1}{2}$ years; seen on the eighth day. Delirium ceased on the eighth day of treatment; after six days, baths administered every six hours (temperature about 39°). Duration of treatment, 14 days; of the disease, 22 days—cured.

Obs. XLVI.—(Idem.) A woman 33 years of age; seen on the eighth day. Delirium disappeared after the third bath; after nine days of treatment (17th day of disease), three baths during 24 hours—cured on the 23rd day of the disease.

The husband of this patient, a simple peasant, began of his own accord to repeat the baths, on the third night of treatment, every two hours, because he saw two hours after the bath that the fever increased, and that the temperature rose to 40. The next day Dr Rondet found pneumonia establishing itself on the middle of the right lung, and in spite of that continued the treatment with energy, and ordered the cold compress on the thorax in the interval of the baths. Three days after the thoracic symptoms disappeared, and the patient took her baths every seven or eight hours.

In this case, some may perchance blame the baths as the cause of the pneumonia; but pneumonia is very often a complication of Enteric (one-seventh according to Grisolle, one-sixth according to Louis), and it has shown itself only once among the fifty cases which I have related. In the second place, the pneumonia we have here is of a special kind—asthenic pneumonia—in which there is only a passive hyperæmia, and which develops itself slowly into progressive congestion; in a word, hypostatic pneumonia (so termed by most authors), which produced neither pain nor crepitant rales, and which in three days quite disappeared. The cold compresses on the thorax should be able to hinder that complication, and they by themselves have proved favourable to the healing. (I have said that the cold baths had little action on the thoracic symptoms which were produced by the Enteric poison, and not by the excess of the temperature.)

Obs. XLVII.—(The same.) A child of the preceding patient, $2\frac{1}{2}$ years old; seen on the sixth day. Baths every three hours during six days, then every six or eight hours, then two baths each day—cured on the twelfth day.

Obs. XLVIII.—(The same.) The sister of the preceding, 6 years old; seen on the third day. Duration of treatment, 13 days—cured.

Obs. XLIX.—(The same.) Mme B—, a vine-dresser, 30 years of age; applied for treatment in the first septenary. Duration of treatment, 12 days; 75 baths; defervescence on the fourth day, after 34 baths—cured.

The cerebral symptoms disappeared rapidly. As the temperature remained high (the decrease after the baths was 2 to 4 tenths), Dr Rondet prescribed, on the 5th day, baths to be given at 18°, of twenty minutes' duration, and from that time her condition rapidly improved, the lowering of the temperature after each being at least 1°.

Obs. L.—(The same.) Charbonnel, 4½ years. Length of treatment, 8 days. The baths were given every three hours, during the first two days only; further on their number was diminished. He had no proper convalescence.

With this patient the rectal temperature fell 2°, often 3°, after each bath. It is important to know that the febrile temperature can be lowered with impunity at the rate of 3° in a few minutes; the observation shows that the febrile ascent was slow, since during the three days of treatment the patient did not take more than three to four baths during twenty-four hours.

Obs. LI.—(Private patient of Dr Grabinski, of Neuville-sur-Saône.) Benoit Fèdy, 8 years; December, January, 1874; seen on third day. Duration of treatment, 10 days; 96 baths; defervescence on the sixth day. Duration of disease, 13 days; convalescence very short.

During the interval of the baths, the iced compresses were applied on the head, which was previously shaven, and cooling lotions were also given every hour. The disease followed a very regular course, and the baths, to the number of eight during the first five days, were reduced to six as soon as the defervescence appeared. As no one in the family could read, the temperature was taken twice a day only, by Grabinski himself. Juergensen says, *Sine thermometro nulla therapia*, but not so Brand. The indications for the bath are very apparent, even to the ignorant: agitation, delirium, heat, redness of the cheeks and nose. This last symptom, pointed out by Brand (1861), is pathognomonic of exacerbation; it is established beyond doubt by an *unequal* redness and turgescence of the cheeks, so that *one alone* presents a dark red colour. The nurse, deprived of the thermometer, should know that these symptoms coincide

with the cessation of the effect of the bath (an effect which ought at least to last two hours, if the bath has been sufficiently cold and sufficiently prolonged), and are formal indications for their renewal. This refutes the objection founded on the impossibility, especially in the country, of correct multiple thermometric measurements. But then it is necessary to have as nurses intelligent observers (as that one in Observation XLVI.), whilst by using the thermometer the conduct of the nurse is nearly mathematically traced beforehand, so that she acts in an automatic manner.

Obs. LII.—(The same.) Jean Fédy, brother of the preceding, 5 years old; from January to February, 1874. Grave type; seen on the eighth day. Treated during 12 days; 82 baths. During the first five days, as the temperature did not fall beyond 41° in the evening, cold lotions were practised every half hour, and cold compresses were continually applied on the thorax and abdomen during the interval between the baths; defervescence took place on the seventh day. Duration of disease, 20 days—cured.

Obs. LIII.—(The same.) François Fédy, 48 years; 16th January to 12th February. Length of treatment, 27 days; first bath on the fourth day of disease. Length of treatment, 12 days; defervescence on the 15th day. During the two days preceding defervescence, the length of the baths was fixed at 20 minutes, because the temperature remained elevated. Four days after his last bath he undertook the treatment of his child (Obs. LIV.), and bathed him himself.

Obs. LIV.—(The same.) Jenny Fédy, 10 years; 23rd January to 25th February. Treatment lasted 34 days. The treatment was strictly carried out until the eighth day. Duration of treatment, 25 days; defervescence on the 16th day; convalescence, 6 days—cured.

Obs. LV.—(The same.) Antoine Fédy, 48 years; 26th January to 3rd March. Duration of disease, 36 days. *Serious adynamic type*; seen on the seventh day of disease, and the baths were commenced at once (the temperature lowered to 41°). The baths were irregularly given during the first days, one of the nurses was confined to bed, the other "could not attend to everyone, for she had other patients to bathe, and two children convalescent from Enteric, who perpetually demanded something to eat (!)" On the eighth day of treatment (15th of the disease), after the baths had been suspended for eight hours in the absence of the physician, a serious aggravation of the

symptoms set in, which Dr Grabinski, and Dr Rondet called by the former in consultation, thought desperate, and the patient "in a state that would have resulted in certain death previous to Brand's method. After an attentive examination, we found no contra indication in persisting in the mode of treatment commenced. Temperature 41.2° . We saw a confluent eruption of rose papules on the upper part of the chest, extending to the chin and the shoulders. He promised to go into his bath, but, after considerable delay, seeing that he still remained hesitating, I plunged him myself in the water, at 19° , and kept him in it for 20 minutes. Since then he never sought to avoid the submersion." Defervescence, six days after 14th day of treatment. Duration of treatment, which was prolonged owing to alimentary excesses, 29 days. Quite convalescent on the 3rd March, when the temperature varied between 37.2° and 38° .

Thus, then, out of 11 cases (Obs. XLIV. to LV.) treated at Curis, where there was an epidemic of Enteric fever, there were 11 cures. But the significance of such a result will be more apparent when the following "*Notes and Reflections on an epidemic of Enteric, by Drs Rondet and Grabinski*" are read:—

"For some time the value of Brand's treatment of Enteric fever has been discussed, and in presence of contradictions which were more apparent than real, we believed it our duty to record what we have seen during an epidemic which reigned at Curis, a commune containing 400 inhabitants. Twenty cases of Enteric showed themselves in six months, and were treated by two different methods.

"The first series included *nine* Enteric patients. We treated them with quinine wine, beef-tea, and diet according to the state of each. Out of this number there were *four deaths*. Such an unfavourable result determined us to try another method. *Eleven* Enteric patients were treated by Brand's method, which we endeavoured to apply as strictly as possible, and from that time we did not lose a single patient. These facts speak for themselves, and are beyond comment."

CONCLUSIONS.

a. *The treatment of Enteric by cold baths is not injurious.*—Of 52 Enteric patients treated at Lyons, or in the neighbourhood, according to Brand's method, from the month of July, 1873, to the month of January, 1874, there have been 52 cures. These figures include 34 men, 11 females, 7 children.

Three cases out of the 52 presented complications. The first (Obs. XXI, syncope and enterorrhagia) was submitted to the treatment on the thirteenth day; the treatment in the second case was late (Obs. XLIV., syncope), the baths did not lower the temperature. The treatment was irregular in the third case (Obs. XLVI., pneumonia), there were no cold compresses; treatment incomplete.

Thus, then, out of 41,000 baths four only have been followed by accident, the blame of which could quite as well be thrown on the disease itself, and on account of which there was no necessity for interrupting the treatment (except in Obs. XLIV., where it was asked by the family.) These accidents were quickly resolved.

b. The treatment of cold baths is useful and superior to other methods of treatment.—In the first place, we hope we have shown that this treatment rests on a well-founded physiological basis; and it is something in therapeutics to know what one does—in fact, in order to conduct a method properly, it is requisite to have what is termed a “*fil médicinal*.” In the second place, it is necessary to state that these 52 cases did not constitute an exceptionally favourable series, in which all of them would be cured independent of the method of treatment. The proportion of 52 cures out of 52 Enteric cases was previously unknown in Lyons; but the treatment by cold baths has only been applied in grave cases, whilst the ordinary statistics include, under the rubric of Enteric, all *typhicules* and *fièvres muqueuses*, which are naturally eliminated from ours as those that have taken less than 40 baths. And finally, eight patients out of the 52 have been submitted to the treatment after the twelfth day, when medicines refused to act, the prognosis being fatal, and the baths only adopted as the last resource.

For the reasons already stated, I have been able to free my statistics from the fatal case which occurred in the Saint-Pothin Ward (submitted to treatment 25 days after the commencement of the disease), which cannot be included with justice; and for the same reason I have left out five cases which were cured (Obs. XVII., XXVIII., XXX., XXXI., XLIV.), in which Brand's method played a very insignificant part, or in which it was applied irregularly. After thus freeing by exclusion the irrelevant matter, we find 47 cases treated by Brand's method.

The conclusions are evident:—

1. The method of treatment which exercises the most favourable influence both on the progress and issue of Enteric,

is that which considers the undue elevation of the temperature and the adynamic tendency of the disease, and which has for its principles of action *refrigeration* and *constant alimentation* of the patient.

Since Brand's work appeared, the statistics founded on 6 to 8000 Enteric patients treated by this method, in Prussia, Austria, and Russia, give a mortality of 4.5 to 7.6 per cent., in place of 18 to 25 per cent, which used to result from the medicinal method.

2. The therapeutical proceeding which corresponds best with the indication: refrigeration consists—first, in the treatment by cold water from the outset of the disease, until it terminates in defervescence; second, to combat each exacerbation and maintain the remissions; third, to administer with that end large cold baths, repeated night and day (according to rules indicated above); cold compresses, cold lotions, and, finally, iced water to drink in the intervals of the baths. (Brand's process.)

That proposition is justified by our third conclusion:—

3. The aphorism of Brand, which says—*Every Enteric patient regularly treated from the commencement by cold water will be free from complications, and will recover*, is true up to this date. It is the same for this aphorism: *Every degenerate case of Enteric, where the treatment is applied late (after the first period), will present greater chances of recovery when treated by cold water regularly administered than under any other method of treatment.*

Out of our 47 cases, in fact, there have only been eight treated after the twelfth day. If the fatal case from Saint Pothin Ward be added, there would be eight successes out of nine cases; an eloquent result, if the peculiar conditions are taken into account, the treatment by cold water having been applied as a last hope when the prognosis was fatal, notwithstanding the use of the medicine employed.

The corollary follows. Every Enteric patient treated by cold water who presents any complication, or who does not recover, has not been treated regularly and from the beginning. This is quite logical, and Brand should not reproach us for having formulated it.

It is to present the truth of this last proposition that we have separated the failures; for there will always be failures, suppose the method should be universally adopted, even in its detail. I only wish to show that cases which are suddenly struck down, and where the patient dies two or three days after he has been put to bed, are those either where the

disease has been latent (*typhus ambulatorius*), or where the patient has been put to bed at the last extremity, and where the method having been administered, apparently at the commencement, will in reality have been applied when the Enteric fever has reached its second period. The *post mortem* will then reveal lesions ulterior to the tenth day (the soonest period, according to Griesinger and most authors, for the detersion of the intestinal ulcerations to appear), and will prove that the pathological commencement had preceded the subjective symptoms.

I do not require to add that such cases will present themselves very exceptionally in private practice, and that in the hospitals the mortality of Enteric reduced to that minimum will not pass from 4 to 5 per cent.

Besides these conditions, in explaining the failures in the cases where the treatment has been regularly carried out from the commencement, there will require to be taken into account the cases of miliary tubercle, which are not so rarely mistaken for Enteric as may be supposed.

As a final conclusion, the results obtained at Lyons by Brand's method to the treatment of Enteric, justifies its adoption in the hospitals of that town, and encourages its use in private practice.

DESCRIPTION OF BRAND'S METHOD.

According to the indications, the physician has the selection of any method which produces refrigeration: Cold compresses, the shower, various lotions, &c.; their regular and methodical application being the only condition indispensable to success. Circumstances and social position may regulate the choice of the refrigerant. Brand prefers the plunge bath, which is the most suitable, its action not depending on the zeal of the nurse. The water should be at the same temperature throughout, and it should not be a tepid bath gradually cooled, the shock in the former case being regarded as beneficial. The instructions to the nurse are as follows:—The nurse will, every three hours, take the rectal temperature of the patient, and give him a bath at 20° C., of 15 minutes' duration, night and day, until the thermometer placed in the rectum for five minutes does not register 38·5° C. The patient is taken to the bath,* his night dress removed, and he is plunged *up to the neck* in the water, at 20° C., while the head is sprayed with water at

* The bath at the Croix-Rousse Hospital is placed in an adjoining room to the Ward.

6° to 8°—an important detail, especially where the patient presents cerebral symptoms. After the nervous symptoms have been allayed, the spray may be given at the same temperature as the bath.* That affusion having lasted one or two minutes, the nurse rubs the limbs of the patient for three or four minutes; then he is left at rest. His breathing may become difficult, and his teeth may chatter, but he must remain in the bath for 15 minutes. When he is about to be removed from the bath the affusion is to be repeated. He should be kept at least 15 minutes in the bath, even should the shivering set in from the commencement; and longer should the shivering be late of appearing.

He is then removed, his night dress put on, without drying him, a sheet is thrown over his feet; his mattress should be hard enough not to yield to the weight of the body, which should be covered by a sheet in summer (also by a light linen cover in winter). A little weak tepid soup is now administered, along with a mouthfull of old wine, and he is left alone to rally from his shivering, which lasts 15 to 20 minutes, sometimes for even an hour.

Fluid nourishment should be given regularly, and always tepid—mouthfuls of iced water should be taken from time to time. If the patient is very weak, a spoonfull of old wine may be administered before the bath.

Reviews.

L—A CLINICAL HISTORY OF THE MEDICAL AND SURGICAL DISEASES OF WOMEN. By ROBERT BARNES, M.D. Pp. 916. London, 1873.

AMONG the generation of practitioners which has now nearly passed away from among us, the word "Specialism" was all but invariably looked upon with suspicion and disfavour. And among the various branches of the healing art which have come to be regarded as special, none perhaps, in the earlier years of its development, has been so coldly received by the bulk of the profession as that which has been promoted to the dignity of a science under the name of Gynecology.

Nor is the reason of this far to seek. Women who are the

* In the Saint-Pothin Ward, I make them place the head under the pipe which supplies the bath.

subjects of the disorders thus classified, or who imagine themselves to be so, as well as those in whom the hope of offspring has been deferred, flock to the specialist for relief or consolation. In no class of patients, perhaps, does credulity reach so high a pitch; and this, taken in connection with the fact that success in this department involves professional work which is both easy and lucrative, makes it abundantly clear what has caused the profession in the past—and to some extent even in the present day—to look askance upon a domain of practice which nevertheless requires as high qualities of mind and of manual dexterity as any other branch of our art. But there is another objection which it would be idle to overlook, springing indeed from the conditions to which we have referred, but which has probably done more to alienate professional sympathy than anything else. This consists in the unsavoury fact that we have here spread before the unprincipled, a fertile and tempting field of quackery. Everyone knows that quackery exists in some cases under the imposing sanction of degrees and diplomas; and if there be any one point which an author, himself like Dr Barnes beyond all suspicion, should boldly face and determine, it is to draw the line indicating the commencement of a debateable land, on the further side of which quackery pure and simple begins. Due allowance must always be made for men whose honesty is undoubted, but who are misled by hobbies and crotchets. We have an illustration of this in the works of Tyler Smith, who assigned to the ovary a presiding influence, both in physiology and pathology, the extent and importance of which he obviously exaggerates. Or when, again, we find such an authority as Graily Hewitt assigning to uterine displacements a position so prominent in the causation of disease as to be obviously absurd, we recognise an illustration more striking still of the uncertain and unsatisfactory position which certain gynaecological questions occupy at the present day, and of the manner in which opinions, honest but erroneous, are the result of what we have called crotchets and hobbies.

Such hallucinations would scarcely deserve to be noticed were it not that, when promulgated by recognised authorities, they are taken up by others, and form the warrant for methods of practice which sooner or later will bring discredit upon their originators. If we are to credit that hysteria is a generic name for uterine versions and flexions, it is but a step further to believe that Hodge's pessaries, in the married and unmarried alike, are in the future to take the place

of valerian, assafoetida, and sal volatile. Given extreme views on this subject, or in regard to the operative treatment of sterility and dysmenorrhœa, and the inevitable result is that modes of treatment are adopted which bring contempt upon the science of gynæcology. We shall not hazard a speculation as to the number of cases in which treatment is fixed by the authority of others, rather than upon honest personal conviction.

We dissent therefore from the suggestion that gynæcological science is either in an advanced or a satisfactory condition. In doing so, however, we freely admit that within the last fifteen years much real and satisfactory progress has been made, based upon careful pathological and clinical research; and we believe that if the ground were swept of certain fallacies which impede the free growth of the truth, matters would stand upon a firmer and more creditable basis.

Dr Barnes strikes a true note in his preface, and practically discards the term "specialist" when he says:—"The physician who neglects the study of the pelvic diseases in women, is constantly in danger of overlooking the efficient cause, or a serious complication, of the more obvious disorder which he undertakes to treat. He cannot possibly understand many of the disorders of the organs of assimilation, of respiration, of circulation, and especially of the nervous system, without a careful investigation of the condition of the reproductive organs. It is here that lies concealed the missing link in his chain of reasoning, the want of which will frequently vitiate all his deductions, and thwart all his efforts in treatment."

Or, in other words, unless the diseases peculiar to women, and the physiological and pathological facts connected therewith, are well understood by the physician, he cannot fitly exercise his professional duties. And to this we would add—and with even greater emphasis—that no one can intelligently and honestly direct his special attention to this class of disease unless he recognises the fact that symptoms which have their chief manifestation in the pelvic region have frequently their origin in abnormal or diseased conditions of distant organs. The error to which the specialist is always prone, is to exaggerate the importance of his own domain, so that when he becomes a specialist he too often ceases to be a physician.

We must not, however, delay longer in giving expression to the opinion that Dr Barnes' present work is a

magnificent contribution to the literature of that branch of the profession with which his name has long been honourably connected. To attempt, however, an exhaustive analysis of so voluminous a treatise would carry us far beyond all reasonable bounds; so that if, in a spirit of friendly criticism, we limit our remarks chiefly to those points in respect to which we differ from our author, it must not for a moment be supposed that we would withhold our approbation for a work which, criticise it as we may, will always remain a monument of industry and a credit to British gynæcology.

Dr Barnes devotes his first five chapters to an account of the anatomy and physiology of the female genital organs; and if one were asked to express a preference in regard to one section of the book over the other, the choice would probably fall upon this. Without being unnecessarily diffuse, the author goes very fully into the subject in this direction, and shows, what indeed no one who knows anything of the literature of his profession can hesitate to credit him with—a wonderfully accurate and precise knowledge of what we owe to physiologists abroad as well as at home. There is one point, however, in regard to which we are astonished to find that he adheres to anatomical ideas which are quite exploded. The reference which he makes to Waldeyer shows that he is not ignorant of the researches of that eminent physiologist as to the structure of the ovaries.* Possibly Dr Barnes may not agree with Waldeyer; but when he says that “the investing structure (of the ovaries) consists of the *peritoneal* or *serous coat*, and of an inner fibrous coat called also the *tunica albuginea*,” he overlooks what in our opinion, is one of the clearest demonstrations of modern physiology. Till recently, the idea universally entertained was that the ovary like the other abdominal and pelvic organs was completely invested by its peritoneal layer, except on the side of its connection with the broad ligament. But Waldeyer has proved, what may be corroborated by examination—to some extent even by the naked eye—that the ovary is to a great extent free in the direction of the peritoneal cavity, and that the investing membrane is thrown into folds at the point where it ceases. It is quite possible that some modified and attenuated structure continuous with the peritoneum and incorporated with the subjacent tunic may exist; but of one thing we may be certain, that

* Fierstock und Ei : ein Beitrag zur Anatomie und Entwicklungsgeschichte der Sexualorgane : Leipzig, 1870.

the old anatomical description will not stand. Another point of great interest has also been established by Waldeyer and others in regard to the early formation of ova (or rather perhaps of Graafian vesicles) by a process of involution upon the external surface of the organ; and this too is a point of which we should have expected to find some notice in a treatise otherwise so exhaustive.

Dr Barnes has a strange fancy for coining new words, which he unfortunately shares with many medical writers of the present day, no department being more fruitful of these than gynecology. We have long been of opinion that much confusion would be avoided if the principle were once established that no individual was to introduce new terms unless with the sanction of some body representing the profession. What, for example, could be simpler than that all suggestions of this nature, and in the department now in question, should be referred to the Obstetrical Societies; when, if satisfied of the necessity for a new word, and the propriety, classical and otherwise, of the one suggested, the term should be launched with the sanction of a corporate authority, and not at the caprice of an individual. In fact, we have had too many new and often quite unnecessary names thrust upon us of late years, and we seriously think that a reconsideration of the whole subject of professional nomenclature would tend to purge our literature of a stilted and pedantic tone, and would render it more intelligible alike to practitioners and students. It is upon these broad grounds, and not because we would impugn his classical knowledge and ingenuity, that we would entreat Dr Barnes to spare us these terms in the future. It may be supposed that, when we can express well by a single new word, an idea which takes half-a-dozen in the vernacular to convey, a good case is made out in favour of the change. But it is not necessarily so, for not only might this, if admitted, soon require the publication of a new lexicon or glossary, but we are bound to discard the term unless it is likely to convey to minds of ordinary professional capacity, a clear idea of its meaning. "Dyspareunia" is one of Dr Barnes' new words, and very hard treatment it has met with at the hands of his critics. For our part, we admit that the word has a strictly classical origin, and is in no way offensive, but it is extremely annoying to be pulled up by a word of this sort, in which it takes time and a good Greek dictionary to discover the signification—"painful coition." The same observation applies, but with much greater force, to the words, "dys-

schezia" and "dysootocia," the interpretation of which we leave to those of our readers whose proclivities may render such a question a point of interest. Again, why discard the respectable old term "vicarious" in favour of "ectopic" menstruation, more especially as the terms "menoxenia" and "menoplasia" have been inflicted upon us by others? In a word, we protest against this tinkering of nomenclature, and are sorry that Dr Barnes' sins in this direction are so conspicuous.

In chapter XV., which is profusely illustrated, a good account is given of the principal instruments which are required by the gynæcologist. For hospital practice, Dr Barnes expresses a preference for Neugebauer's speculum, which combines the character of the bivalve and double duck-bill instruments. For obvious reasons it is not so suitable for private practice. We are sorry to see in this chapter, bracketed, as it were, with such instruments of every-day use as the speculum and the sound, so prominent a position given to metrotomes; but upon this subject we shall have something more to say in our remarks on a subsequent chapter.

The diagnosis of diseases of the pelvic organs, including the various methods by the touch, the sound, and the speculum, is next treated of in a manner worthy of the high reputation of the author. He begins by reiterating, with greater emphasis, what was shadowed forth in the preface as to the danger of specialism. "Remember," he says, "that the fault may be in distant parts; that disease in other organs may complicate disease in the pelvic organs. Do not, in short, fall into the fatal snare of being a specialist." The directions which are given as to the various methods by which the sense of touch is used in the diagnosis of pelvic diseases are clear and simple, and admirably fitted to communicate information and instruction to the student. We scarcely think that the meaning which, at page 148, Dr Barnes means to convey is that there is any considerable number of cases in which we are justified for diagnostic purposes in exploring the bladder by the finger in the urethra. And yet such is the impression which might be conveyed by a rather loosely worded sentence, leading to errors in practice to which Dr Barnes himself would be the last to give his sanction. The directions which are given for the use of the sound are admirable, and we are particularly pleased by the caution which he gives—"Before taking up the sound, one precaution is imperative. Be satisfied that the patient is not pregnant." A terse aphorism like

this in introducing the subject of an instrument which is dangerous in unskilful hands, is of incalculable advantage; for if the truth were known, we rather think it would transpire that the number of cases of abortion arising from the improper and reckless use of the sound has been very considerable; so that an impressive caution such as the one we have quoted is just what is required. The illustrations of this chapter are not so satisfactory as are most of the other. In the first place, we do not share Dr Barnes' satisfaction with the diagrammatic sketches which, "with skilled assistance," he has produced for the purposes of clinical notation; and in the second, it is quite obvious that Fig. 40 is wrongly placed on the block, with the effect of increasing the inclination of the pelvis, and consequently exaggerating the anteversion of the uterus during pregnancy, which the figure was designed to illustrate.

The chapter on Menstruation is also excellent, but we greatly question whether the author is justified in accepting as correct the statement of Mandl, with reference to the non-coagulability of menstrual blood, that "the smallest quantity of pus or mucus stopped blood from coagulating." This at least is in direct opposition to the results which Mr H. Lee and Dr M'Kenzie give as proved by the experiments which they performed with a view to the elucidation of the pathology of phlegmasia dolens, and would tend, if admitted, to overturn the ideas now most generally adopted as to the nature of that disorder. The following paragraph, involving an original observation by Dr Barnes on a highly interesting subject, we quote entire:—

"It is convenient here to notice the influence menstruation exerts upon the milk. It is generally believed that the milk is injuriously affected; and common observation shows that the suckling is often griped or has diarrhoea, at the nurse's monthly periods. Raciborski, indeed, says the milk is not sensibly altered in its properties; it simply appears to be less rich in cream. I have, however, observed that colostrum globules were reproduced at every menstrual epoch. And it must be borne in mind that the activity of the ovaries renders the nurse more susceptible to moral impressions and to emotions. The influence of emotion in disturbing the milk cannot be doubted. In the contention for supremacy, the ovary is pretty sure to win. If the woman is exposed to sexual relations, active ovulation and menstruation are very likely to be quickly resumed. Thus, in spite of suckling, impregnation often occurs within two or three months.

of delivery; and not a few women fall pregnant within six months, 'without seeing anything between.' On the other hand, women who have become widows before or soon after delivery, and lived a single life afterwards, out of a feeling of concentrated affection, keep up lactation for eighteen months or two years without a return to menstruation. But this, perhaps, they could not have done had the ovaries been subject to the excitement of married life."

The various disorders of menstruation are, as we might expect, treated of in an exhaustive manner. In regard to the treatment of amenorrhœa, attention is drawn to a fact which is familiar to every physician of experience, that when, (admitting as an axiom that iron is the remedy *par excellence* when there is a deficiency in red globules), we administer freely that drug, we not unfrequently find that far from doing good it actually makes matters worse than before. This Dr Barnes has learned from long clinical experience, and he has observed further that in such cases "the tongue gets parched and brown, indicating a like state throughout the alimentary canal, inducing constipation, and generally impeding nutrition; violent headache ensues; the pulse rises in frequency." Under such circumstances he has found benefit from the administration of salines, and indicates a preference for the old *spiritus Mindereri*, with occasionally a little nitrate of potash, and some light tonic, such as hop, cinchona, or calumba. When the vascular irritability has been subdued, iron may then be cautiously tried.

The subject of dysmenorrhœa is one to which, in opening Dr Barnes' work as a new authority, we turn with much interest, as around this subject centres some of the most interesting problems of rational gynæcology. Five classes of cases are admitted,—1. Neuralgic, or sympathetic; 2. Congestive or inflammatory; 3. Mechanical anomalies of the uterus; 4. Fallopian obstruction; 5. Ovarian disorder, constituting a distinct form of dysmenorrhœa. The point in connection with this classification to which the greatest amount of interest attaches is the third group, and involves a consideration both of the proportion of cases which may fairly be called examples of mechanical dysmenorrhœa, and of the treatment which is proper under the circumstances. A minute analysis of our author's views on this important subject is of course impossible within the limited space at our command, but the impression which a careful perusal of this chapter leaves upon our mind is that Dr Barnes, like some other modern writers, attaches too great importance

to mechanical theories in the causation of dysmenorrhœa. "The essential cause," he says, "of dysmenorrhœa—at least in the great majority of cases—is retention of the menstrual secretion. The exceptions in my experience are very few." This is one of the very few instances in the work in which Dr Barnes, unconsciously no doubt, mounts a hobby. If all cases of dysmenorrhœa, "with very few exceptions" in his experience, are due to retained menses, such retention involves the idea of mechanical obstruction. Let us grant the accuracy of his assertion for the moment, and this brings us to the inevitable conclusion that in the vast majority of cases of dysmenorrhœa mechanical treatment is required, and this is precisely the conclusion at which he arrives.

There is almost a confession of weakness, as we take it, in the classification with which the author starts, and which we have quoted. Why give such prominence to the "congestive" and "neuralgic" varieties, and why call special attention to cases in which the cause is to be found in the ovaries or the Fallopian tubes, if all these cases taken collectively form only "the few exceptions"? Dr Barnes is too honest an observer to deny the occurrence of these varieties, and we can only account for the manner in which he puts the question, in opposition to the experience of nine persons out of ten, by supposing that when he finds obvious congestion, he having embraced so fully the retention theory, assumes that congestion is the result of the retention, and not, as most of us would probably do, that the dysmenorrhœa is the result of the congestion. Dr Barnes will not dispute the fact that congestion may co-exist with flexion. But he would probably contradict us if we presumed to assert that congestion was probably the primary cause of the flexion, and that although the latter might undoubtedly aggravate the suffering of the patient, we are not warranted in assuming it to be the essential or potential cause.

A more serious matter, however, is, what we might naturally anticipate, that the theory leads by logical sequence to mechanical or operative treatment in the great majority of cases. Dr Barnes has little or no faith in sponge or tangle tents, or in other means for mechanical distension of the cervix, and he is probably right when he asserts that contraction which is thus overcome will usually return. The belief which is usually entertained by those who argue in favour of the treatment of dysmenorrhœa by operation, is that the obstruction is at the os internum, and

founding upon this—which receives corroboration, we may remark from some interesting observations by Dr Matthews Duncan—Simpson and his followers so used the metrotome as to cut through the assumed stricture at the os internum. It is well known that even in the most skilful hands this operation is dangerous, and has not unfrequently proved fatal by hæmorrhage. On this point we entirely sympathize with Dr Barnes, who shows very clearly how the situation of the vessels with reference to the os internum renders the operation then a most unsafe one, and argues with perfect and obvious propriety that the operation should be discontinued as being neither efficacious nor safe. But when he goes on to say that the obstruction is not at the os internum but at the os externum, and that the proper treatment is slitting up the os tincae and the greater part of the cervix, we are at issue with him in regard to both his conclusions. We believe at least that in most of the few cases in which simple obstruction or stricture is the cause of dysmenorrhœa, its site is at the os internum; and even when the obstruction described by him does occur, relief can, we are sure, be permanently afforded by internal scarification of the os externum and subsequent dilatation by the judicious use of tents. Barnes' operation has, we must admit, the advantage of comparative safety; but at the cost of needless mutilation, with more than doubtful results.

The manner in which obstruction takes place at the os internum by flexion of the organ at this point is pointed out, and when this is obvious, the proper procedure clearly is to treat the dysmenorrhœa by restoring the uterus to its normal axis, and maintaining it in its proper position until the supporting structures regain their tone. Instead of being an instrument of every-day use, we conceive that the metrotome should only be employed in very rare and exceptional instances, when all other means have failed. We deeply regret that Dr Barnes gives the weight of his great authority to the frequent use of such operative measures. And the same remarks may be held to apply to similar treatment which is in too many cases rashly adopted with the view of removing an imaginary barrier to impregnation, and this indeed we would the more strongly urge, as it is here that quackery with all its venal hideousness comes so prominently into play.

Turning now to a more advanced section of the work, we are glad to find the important subject of uterine displacements treated in a calm, judicious, and impartial manner. Dr Barnes

is undoubtedly correct when he says that retroflexion is much more common than retroversion, and in the treatment of both of these displacements he expresses a decided preference for the admirable lever pessaries which we owe to the ingenuity of Dr Hodge. We should have liked him, we confess, to have called attention to the fact that to recommend a Hodge's pessary is often as useless as if we were to recommend a ready-made set of artificial teeth. Those rings which admit of adaptation are in material and otherwise very objectionable, so that in ordinary cases when we have a difficulty in fitting a lever of ordinary size and shape, it will be found convenient to mould an india rubber ring, strengthened with a copper wire, to the desired shape, and after carefully withdrawing it have a vulcanite lever specially made. In anteversion and antelexion he recommends Thomas's modification of Hodge's pessary. Intra-uterine stems are justly and unhesitatingly condemned when connected with external apparatus of any kind, and disapproval is also expressed of any combination of the stem and lever pessary which involves continuity and immobility between the two. What he urges as applicable to those obstinate cases in which the lever pessary alone fails to cure the displacement, is an intra-uterine stem, by means of which the axis of the uterus is in the first place straightened, and in addition a lever pessary, which then suffices to preserve the straightened organ in its normal axis, without interfering with its proper and natural mobility. Simpson's galvanic pessary, an instrument which its ingenious contriver had, we have reason to believe, in a great measure discarded, we are somewhat astonished to find cropping up under the patronage of Dr Barnes, chiefly, however, in the treatment of dysmenorrhœa. That a galvanic current is thereby produced is undoubted, but a very serious and objectionable result of this is the deposition of salts, so that an instrument long retained has frequently been removed completely incrustated with salts. Such an obvious source of danger as this, and the danger generally which attends the use of intra-uterine pessaries, we should have liked to have seen more prominently put forward as a caution to students and others, in a manner similar to that which our author has so judiciously employed in the case of the uterine sound.

Were it possible for us to go more fully into the various subjects which are embraced in Dr Barnes' work, our criticism would take more emphatically the form of commendation. Exception has been taken, we think somewhat unjustly, to its style and diction. He is, with a few trivial exceptions, clear and terse, and shows a tolerance and respect for the views of others

which command esteem and confidence. And if in some points he steps warily on ground where we would have had him tread more boldly, it is probably from an amiable desire to avoid painful controversy with personal friends. We have had quite recent evidence that when attacked he can hit hard enough, but we can scarcely blame him if he shrinks from attacks which might be deemed personal. Still, we adhere to our conviction that British gynaecology will not be placed on a satisfactory basis till some wide-spread errors shall be rooted out by the hand of unsparing criticism.

II.—LESSONS IN LARYNGOSCOPY, INCLUDING RHINOSCOPY AND THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE THROAT. *By PROSSER JAMES, M.D., M.R.C.P., &c., &c.* London: Baillière, Tyn dall, & Son, 1873.

THIS is a very excellent book; perhaps the best in our language for students of the important and now popular subject of which it treats. It is short and practical, yet sufficiently minute as well as sufficiently comprehensive, and the text is illustrated by some excellent wood-cuts, and by four admirable coloured plates.

One of the most marked features of this work, or rather of its author, is a comparative freedom from the unpleasant fault of egotism. The labours of others in the same department are gracefully recognised and their merits acknowledged, even those of pre-laryngoscopic times, and thus not only is the work far removed from the rank of controversial treatises, but it is also raised above such as are obviously written for merely selfish purposes—as puffs, in fact, of their authors. Dr Prosser James does not need anything of this kind, and he was right to avoid even the possibility of such a motive being attributed to him in writing his book.

The practical suggestions given to the beginner in the art of laryngoscopy are shortly and clearly stated, and we believe them to be sound and good. We quote the following as an illustration, and also because we have ourselves found the difficulty alluded to very puzzling to young laryngoscopists:—“Some have mistaken for elongated uvula a natural conformation of the parts in which the opening of the pharynx is large and the uvula from its distance *liable to fall before the mirror*. This is more likely to occur if the pupil carry his mirror too far back, or attempt to support it against the pharyngeal wall. In all these cases choose the largest mirror for which there is room, and, if necessary, support it by its handle against

the teeth, or by the little finger resting on the patient's cheek, and make your examination while the patient takes a deep inspiration, and then utters a falsetto note."

He next passes to the difficulty of raising the epiglottis from the cords, and recommends change of position of the patient's head, touching the epiglottis with the finger, and perhaps holding it forward with the pincette of Fournié or M'Kenzie. Dr James remarks that breathing by rapid snatches and inspiring deeply, at the same time sounding a treble note, assists in elevating the epiglottis. We have found much good from making the patient sound different vowels, as ah or eh, and prolonging the sounds as much as possible. It must, however, be confessed that in some happily rare cases this is an almost insuperable difficulty, and one almost sympathises with, though, of course, he cannot approve of, the plan of some German laryngoscopists—viz., to pass a ligature through the offending organ, and thus effectually pull it out of the way.

The theory of laryngoscopy is next given, and the following common mistake is very clearly corrected.

"Some students come to us with a notion that there is a lateral (as well as an antero-posterior) inversion of the image in the laryngeal mirror. There is no such thing. The idea can only arise from a confusion of terms. . . . In the laryngeal mirror the physician sees both cords at once, but they are not inverted. He must remember that it is the image of the patient's cords he sees, not his own. The standard of right and left must therefore be referred to the patient, and then it will be manifest that, as the left cord of the patient is opposite the right of the physician, so it appears on what the observer calls the right side of the mirror, but what would be called by the patient its left side."

This is illustrated by reference to two engravings: One, of the parts as they are in nature, and the other, of the same parts as they appear in the mirror.

"The same facts may be illustrated still more aptly," he observes, "by taking an ordinary laryngeal mirror and holding it over any of these pages in a similar oblique position. In that mirror the reader can examine any of the engravings, and see them just as he will see the patient's larynx, and the learner will find it excellent practice."

Experience of the actual manipulations required is the great teacher after all, and the student must come through many failures, or at least partial successes, before he attains certainty and skill in laryngoscopy.—"He should," remarks our

author, "get a competent teacher to select for him a patient with a well developed larynx, and who is accustomed to the inspection." If he do not, he will find that in some patients he will "see but little, and in others possibly nothing at all."

Dr James has nothing new to recommend in the way of learning the art. He advises the student to look over the shoulder of the teacher, and thus to get his first view of the parts. He also recommends the use of plates and models, as well as auto-laryngoscopy. For our part, while we agree with all this, we have found it very useful to set the pupil early to use the instruments for himself, certainly under superintendence. Thus the teacher may look over the shoulder of the pupil, and see that he is exhibiting the parts clearly and well. It is surprising how soon some students acquire a considerable amount of skill in this way.

But we must proceed more rapidly. Many will be interested, as we were, to read the short monograph of Garcia on the "Cause of the Human Voice." It is singularly accurate in its details, but we cannot quite comprehend the theory he proposes. He attributes the voice to "the pressure of the air," also to "the rigidity of the glottis," and again to "sharp explosions" of the air in passing through the opening of the glottis. Now these are all true conditions of vocalization, but surely the chief of them all is the vibration of the glottidean valves. No doubt the columns of air above and below the glottis must consonate with its vibrations in order to unison, yet the original cause of the sonorous movement is the vibration of the glottis itself. Hence we have a wonderful apparatus for regulating at will the tension of the glottis, and for otherwise controlling its vibrations.

We must pass over the very well told history of the practical application of the laryngoscope, and take up a few points of its uses in diagnosis and treatment. Dr James lays great stress on the changes in colour observed in disease of the larynx, but he also shows the importance of changes of form. Thus he justly observes that "inflammation in the larynx is particularly manifested by the two first terms of its ancient definition—*rubor et tumor*. Exudation, ulceration, suppuration, hemorrhage, and various growths are also shortly noticed. "Besides changes in colour and form, the laryngoscope reveals lesions that affect motor power. Impairment of motor power may be slight, or it may proceed to its abolition, when we have paralysis of the

glottis. So exaggeration of movement may produce slight or occasional symptoms, or may appear as spasms of the glottis."

In proceeding to discuss the treatment of laryngeal diseases, Dr James remarks—"Although I was the first to resort to laryngoscopic medication, I have always deprecated the excessive topical applications to the delicate organ of voice, and urged the necessity of availing ourselves of constitutional remedies. Success as a laryngoscopist is not to be attained by devoting exclusive attention to a single organ, as though that were not, after all, but a small part of the body. The whole aim of the physician is to cure or, if that be impossible, to relieve his patients; and this can only be attained by a careful study of all the conditions, many of which relate to the general health rather than to slight deviations from the natural condition of a single part." With these sensible remarks, showing that Dr James is not merely a specialist, he proceeds to devote his attention in the present work to the local therapeutics of throat diseases.

Our author does not seem to have so very decided a preference for the brush over the probang in applying fluids to the larynx as some other writers on the subject profess to have; yet he correctly says the probangs usually sold are unfit for passing into the larynx. They are much too clumsy, and their sponges too large. If intended for laryngeal use, they must be made specially for that purpose, and when so made they are quite as good as the brushes, and as little likely to produce unpleasant symptoms. Dr James tells us that "in the most skilled hands the *brush* may occasionally set up a choking sensation, a degree of irritation or pain, a contraction of the vestibule, and even a true spasm of the glottis." Worse could not be said of the sponge probang by its most vehement opponent.

Again, on another point of dispute, Dr James gives his opinion against the modern innovator as follows:—

"Solutions of silver nitrate were amongst the earliest employed, and in suitable cases were of great value. Some writers think this substance the most liable to give rise to spasm, and for that reason have nearly discarded it. Others do not accept this doctrine. The fact is, that the effects of this remedy differ much with the strength of the solution. I have used it from 5 grs. in 1 oz. to 120 grs., and though other remedies may often be advantageously preferred, I cannot look upon it as a simple astringent, or consent to altogether deprive my patients of its remarkable properties."

His remarks upon the injection of liquids into the larynx, and on the insufflation of powders are equally judicious; but we pass hurriedly on to notice, in conclusion, the somewhat novel idea of "laryngeal gargling." This originated with M. Guinier, of Montpellier, who seems to have educated his larynx to actually bear the intrusion of liquids used as gargles; but we fancy that few patients will be able to avail themselves of this method of treatment. Still it is true that gargling requires and admits of much education on the part of the individual using it, and a good deal may be done in the way of advice by the physician, which is at present neglected. The use of inhalations and the inspiration of atomised fluids are perhaps still more efficacious than laryngeal medications, and since they require no skill on the part of the patient, may be prescribed for old and young indiscriminately.

Exchange Journals.

By DR JOSEPH COATS, *Lecturer on Pathology in Glasgow University, &c.*

STRICKER'S MEDIZINISCHE JAHRBÜCHER.

PART I., 1874.

CONTENTS.—I. On the centres of the uterine and vaso-motor nerves, by Dr W. Schlesinger, (with a plate). II. Investigation on the respiratory nerve-centres by Dr P. Rokitsky. III. On the interchangeable relations between the retina and the colour of the skin of some animals, by M. G. Pouchet, Paris. IV. The retardation of the movements of the intestine through the splanchnic nerve, by Dr S. v. Basch, (with a plate). V. Investigations on the septum atriorum of the frog and the rabbit, by Dr J. Champneys, London. VI. On the function of the semicircular canals of the labyrinth of the ear, by Dr J. Breuer, Vienna.

I. Situation of the uterine and vaso-motor centres (Schlesinger).—This paper and the following one present to us certain results of experiment, which if confirmed must be looked on as important contributions to physiology. In former papers the present author, along with Oser, has shown that a close relation seems to exist between the uterine and vaso-motor centres. (See this Journal, January 1874, p. 128.) These centres respectively are not only subject to similar laws, but appear also to have situations near each other in the central nervous system. It has hitherto been pretty generally agreed that the vaso-motor centres are situated above the level of the atlas (it is well known that when the medulla oblongata is divided there follows a general dilatation of the arteries throughout the body), and in these papers of Schlesinger and Oser, it was inferred that the uterine centres had a similar situation. By the experiments related in this paper, however, considerable doubt is thrown on this opinion, or it is shown, at least,

to require considerable modification. In the first place, it appears that the administration of strychnia to an animal increases the intra-vascular pressure in the usual way by contraction of the smaller vessels. But it is also shown in these experiments that strychnia produces this effect even in a higher degree after division of the medulla oblongata. At the same time strychnia also produces energetic contractions of the uterus. There are two possible explanations of this, either there are centres beneath the medulla oblongata which are irritated by the strychnia, or the strychnia directly irritates the vessels and uterus. Further experimentation renders the former of these by much the more probable. That is to say, the author has succeeded in irritating such centres by other agents than strychnia. Strychnia seems to possess the power of wakening up the centres situated beneath the medulla oblongata, so that in animals to which a small dose has been given, these centres react as if there was no division of the medulla oblongata. Thus, dyspnoea in uninjured animals produces increase of the intra-vascular pressure, but does not do so when the medulla oblongata has been cut. If, however, strychnia has been previously administered, the suspension of respiration produces rapid and great increase of the intra-vascular pressure. Similarly it is possible in animals whose medulla oblongata has been divided, and to whom a small dose of strychnia has been given, to produce reflexly contraction both of the vessels and uterus. Irritation of the median nerve produces contraction of the uterus in animals under the influence of strychnia, and where the medulla oblongata has been divided. It seems from these experiments, therefore, that there are centres for the vessels and uterus in the spinal cord; it seems extremely likely in fact that the actual centres are not situated above the medulla oblongata at all, but that under ordinary circumstances they are put out of action by its division. As if for the actual performance of their functions by these centres, a connection with the brain is necessary, but that the influence furnished by the brain under ordinary circumstances, can be supplied by the use of strychnia. For other centres besides those specially referred to, these observations may possibly have considerable importance. It seems that when, by the division of the medulla oblongata, a centre is put out of action, it is not necessary that this centre should be situated above the divided part. Our inferences, therefore, as to certain centres above the medulla may be mistaken.

II. Situation of the centres of the respiratory nerves (*Rokitansky*).

—This paper, on the ground of experiments, makes similar assertions in respect to the respiratory centres, as the former one for the uterine and vaso-motor. Both these experiments and Schlesinger's were made on rabbits. These animals, when the medulla oblongata has been divided, and strychnia administered, still carry on respiratory movements. That these were true respiratory movements was proved by exposing the diaphragm and intercostal muscles. Again, rabbits which have had the medulla oblongata divided at its upper extremity, just posterior to the pons, die after a time from defect of the respiration. Respiration exists for a time, but is so defective that the animal soon dies. The persistence, however, of even defective respiration, seems to show that there are still centres in communication. But now, in animals where the medulla oblongata has been divided at the posterior extremity of the pons, and which have ceased to breathe, respiration may be restored by the injection of strychnia. Thus division of the medulla seems to disturb respiration, strychnia to restore it.

III. Relation between the retina and colour of the skin (*Pouchet*).

—The author found in a number of fishes, that extirpation of the cornea

produced a marked darkening of the skin. He also describes a process of artificial respiration for fishes. He introduces an india-rubber tube into the mouth, and passes through it a stream of water. By this means he can keep fishes alive for a considerable time, even after they have been paralysed by curare.

IV. Influence of the splanchnic on intestinal movements (*Basch*).

—In a former paper the author has shown that nicotin produces very marked peristaltic movements of the intestine, and that it does so by a direct action on the coats of the intestine. (See this Journal, January 1874, p. 126). He has thought that this afforded a good opportunity for studying the influence of the splanchnic nerve on the intestine. It has long been known that the irritation of the nerve retards the movements of the gut, and it does so when these movements are produced by injection of nicotin. It is a matter of dispute, however, whether this retardation is due to a direct retarding action of the nerve on the intestines, such as the vagus has on the heart, or whether it only acts indirectly through the vessels. The splanchnic is a vaso-motor nerve, and the author found that when it is irritated the intra-vascular pressure increases *pari passu* with the stoppage of the movements of the intestine. He is therefore of opinion that the irritation of the nerve causes contraction of the vessels, and the vessels being emptied, the nicotin ceases to be applied to the intestinal wall, and so the movements cease. The splanchnic would thus seem to have no special function in the same sense as the depressor branch of the vagus.

VI. Functions of the semicircular canals (*Breuer*).—In a foot note, the author of this paper mentions that Professor Mach of Prague has independently, and apparently simultaneously, come to the same conclusions as are here expressed. The function of the semicircular canals has long been a matter of doubt. Flourens found that their destruction caused permanent and considerable modification of the movements of animals. This only increased the mystery. Goltz first gave the key to the mystery when, so lately as 1870, he repeated some of the experiments of Flourens. He found that when, after destruction of the semicircular canals, the animal survived and the wound healed, there was no interference with hearing, but the head was permanently twisted. He concluded that these canals may have something to do with hearing, but that they are mainly an arrangement for preserving the equilibrium of the body; they are, so to say, organs of sense for the equilibrium of the head, and mediately of the body. The present paper is an attempt to explain how the canals exercise this function. The author disagrees with the views of Goltz in this respect—Goltz considered that, according to the position of the head, the fluid in the membranous canals (endolymph) would press on different portions of these canals, and affect the nerves accordingly, and by this means the position of the head would be appreciated. The present author points out that the ampullæ possess an extremely delicate nervous arrangement, the nerve-termination being apparently connected with epithelium, which possesses hairs projecting into the fluid contained in the membranous canals. This structure is so arranged, therefore, that any currents in the endolymph will affect the nerve ends. And now, when the head is twisted, currents will be set up in the fluid, and their direction will vary in the three canals according to the kind of movement. This view is supported by a very elaborate analysis, which would occupy too much space to abstract here. We may be allowed to mention a few of the points brought forward. The view is perfectly consistent with the effects observed after destruction of the organ. There are in these cases violent compensating movements of

the head and eyes, those of the latter amounting to nystagmus, such as might be looked for where the currents were interfered with and artificially produced. Then the feeling of giddiness produced in suddenly stopping after turning round and round, are abundantly explained by this theory. On turning round and round, currents will be set up in directions opposite to that of the movement of the body. By and by, however, as the movement continues, the endolymph will gradually get a motion in the same direction as the body; will come again into a state of rest relatively to the body. But when the movement of the body is suddenly stopped, the fluid in the canals will continue to move forward, and there will again be currents set up, but in a direction contrary to those produced at the commencement of the turning round movement. The impression conveyed by the nerves will therefore be as if the head were being rotated in a direction opposite to that in which it had been previously. It is well known that such is the case, and it is also matter of experience that movements of the body are involuntarily made to balance the apparent rotation. It is also pointed out that an observation of Hitzig is really confirmatory of the author's view. He produces a feeling of giddiness, and the usual reflex balancing movements, by electric irritation through the skull. The giddiness is the greater the nearer the electrodes are to the petrous portion of the temporal, and though Hitzig does not notice it, yet the author has no doubt that here the nervous expansions of the ampullæ are directly irritated. The author does not consider that the semicircular canals are concerned so much with the coarser rotary movements as with the finer and more delicate. The coarser movements are appreciated by touch, muscular feeling, and so on, and these may even in part replace the function of the semicircular canals. The paper is a very interesting one, as will be seen from this imperfect abstract, and it would repay a more careful perusal.

VIRCHOW'S ARCHIV.

VOL. LIX., PART II., JANUARY, 1874.

CONTENTS.—VIII. Physiological investigations on digestion and absorption in the large intestine of man, by Czerny and J. Latschenberger, Freiburg. IX. Epithelial cancer of the dura mater, with hyaline degeneration, by Dr J. v. Rustizky, Kiew (Plate III., figs. 1-8). X. Investigations on absorption of bone and giant-cells, by the same (Plate III., figs. 1-8). XI. Development of cancer of the kidney from the epithelium of the urinary tubules, by Dr J. v. Perwerseff (Plates IV and V). XII. Observations on the femur, by Prof. Fr. Merkel, Rostock (Plates VI. and VII). XIII. On hereditary nephritis and heredity in general, by Dr F. Samelsohn, Cologne. XIV. On general reflex paralysis of the vasa-motor nerves, and affection of the spinal cord, with lesions of numerous organs, after suppression of the perspiration (varnishing of the animals); experimental study, by Dr Feinberg. XV. The share taken by oxygen in the formation of pus, by Prof. Binz, Bonn. XVI. Smaller communications: (1) Remarks on Dr Joseph's studies, by Professor Merkel; (2) On the relation of white and red corpuscles after suppurations, by Dr Apolant, Berlin; (3) On popular medical literature, by Dr W. Stricker, Frankfurt.

VIII. Digestion and Absorption in the Large Intestine (*Czerny and Latschenberger*).—These are very interesting experiments made on a man with artificial anus at the sigmoid flexure. The rectum was quite separate from the rest of the intestine, and it could be filled from above and emptied through the anus at pleasure. The mucous membrane was not sensitive,

and the gut did not contract on pricking it with a needle, or irritating with an induction current. The continuous current produced lively contractions. Simple touch did not produce any contraction, but stroking the mucous membrane did; and on introducing the finger it was grasped by the gut. To test the function of this portion of the intestines, two sets of experiments were made—one to determine the power of digestion, and the other that of absorption. Experiments made with coagulated albumen, fat, and starch, showed that the rectum and its secretion have no power of digestion either on albumen or fat, but that possibly they may be able to convert starch into sugar. On the other hand the mucous membrane absorbs water very rapidly, and in its normal condition it absorbs dissolved albumen unchanged. Fat is absorbed when in emulsion. Starch is also absorbed, but it is uncertain whether or not it is first converted into sugar. Every state of irritation hinders or suspends absorption. Common salt and most crystalloids interfere with absorption, causing irritation. Sulphate of magnesia caused violent reaction, the mucous membrane became red, the mucus was increased, and epithelium shed.

XI. Origin of Cancer (*Pereverseff*).—This and the two papers which precede it are by students under Recklinghausen in Strasburg. The examination of a case of cancer of the kidney confirms the view that the tumour takes origin from the epithelium of the uriniferous tubules. He demonstrates this, which may be called a cancerous degeneration, in all parts of the tubules, and in all stages. At first there is chiefly an epithelial growth, but as the tumour increases there is irritation in its neighbourhood, and an increase of the connective tissue.

XIII. Hereditary Nephritis (*Samelsohn*).—This author gives some cases of hereditary Bright's disease, and suggests a possible explanation of the heredity. He supposes that in these cases there may have been a congenital and hereditary malformation of the vascular system.

XIV. Cause of Death after Varnishing Animals (*Feinberg*).—The cause of death after the skin of animals has been covered with varnish has been the subject of much discussion. It has been ascribed to asphyxia, reduction of temperature, retention of sweat, &c. The author has repeated the experiments, and he considers that the symptoms are due to a general dilatation of the entire vessels of the body. He finds in all parts dilatation, over-filling, and often rupture of the blood vessels. In the spinal cord there was congestion, extravasation of blood, and hyperplastic formation of the neuroglia around the extravasations. There were constantly extravasations in the mucous membrane of the stomach. There were often extravasations in the liver, &c. Such an universal relaxation of the blood vessels throughout the body must be due to paralysis of the vaso-motor centres. This would produce immense reduction of the intravascular pressure, and sinking of the action of the heart with stasis in the capillaries. It is well known that the vaso-motor centres are subject to reflex action by irritation of sensory nerves; and it is here supposed that the intense irritation of the cutaneous nerves by the varnishing may be sufficient to paralyse these centres. This would account for the phenomena. The nervous symptoms, such as hyperæsthesia, partial anæsthesia, reflex tetanic convulsions, partial paralysis, &c, are sufficiently accounted for by the congestion of the grey matter of the cord. Then the very marked reduction of temperature may be due to the increased radiation of heat in the hyperæmic cutaneous vessels. It is to be noted that the author's microscopic specimens were looked over, and his facts confirmed by the distinguished histologist Frey.

XV. The share of Oxygen in the formation of pus (Binz).—This author adopts the original view of Cohnheim, that in suppuration the white blood corpuscles, by their power of amœboid motion, find their way through the walls of the vessels. He believes, however, that in order to this activity on the part of the white corpuscles a supply of oxygen is needed; and he considers that the red corpuscles, as they are the chief vehicles of oxygen in the blood, are able to supply oxygen to the white corpuscles under these circumstances. It is matter of frequent observation, in studying the processes of inflammation in the living body, that a small vessel may be filled with white corpuscles and serum, without any of the former wandering out of the vessel. But by and bye a few red corpuscles drop into the vessel, and then the white corpuscles become active and pass out. That the red corpuscles contain a large quantity of oxygen is well known; serum only contains 1.5 volume per cent.; venous blood 9 per cent., and arterial 14 per cent.

XVI. (2) Relation of red and white blood corpuscles after suppurations (Apolant).—In this paper a case is related in which successive crops of pustules or small abscesses occurred in a boy, from which a good deal of pus was obtained. Early in the disease the white corpuscles in the blood were abnormally numerous, about 1 to 20 red (instead of about 1 to 400); there was then a distinct leucocytosis. As the small abscesses or pustules became less numerous, the proportion of white corpuscles became reduced to 1 to 200 red, and the author considers that the suppuration was the cause of the reduction, presumably by draining off the white corpuscles. It must remain a question, however, whether the leucocytosis was not rather the cause of the suppurations, and as the former became less the latter also got reduced. The author, in order to test his view made some experiments on animals, to see whether suppurations reduced the proportion of white corpuscles. His results were somewhat inconclusive; in some cases there seemed to be a slight reduction.

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PARTS III. AND IV., FEBRUARY, 1874.

CONTENTS. XVII. Scotch pretensions, by Rud. Virchow. XVIII. The pathogenesis of Hemiplegia, by Dr O. Berger, Breslau. XIX. Contributions to the comparative and experimental pathology of the constitutional and infective diseases, by Prof. O. Bollinger, Zurich; (1) Leuchæmia in domestic animals; (2) The syphilis of hares; (3) Endoarteritis villosa of the bulb of the aorta in horses. XX. Albuminuria, a symptom of the epileptic fit, by Dr M. Huppert, Colditz. XXI. On the innervation of the plexus chorioides inferior, by Prof. M. Benedikt, Vienna (Plates XIII. and XIX.). XXII. Two rare cases of the formation of urinary calculus, by Dr C. Fürstner, Greifswald (Plate X.). XXIII. On the diabetic puncture in birds, by Dr. M. Bernhardt, Berlin. XXIV. Contributions to Onkology, by Dr F. Steudener, Halle (Plate XI). XXV. On a new and simple method for determining the psychical activity of the the brain of the insane, by Dr H. Obersteiner, jun., Döbling (Plate XII). XXVI. On the mode of therapeutic action of iodide of potassium and corrosive sublimate, by Dr H. Kämmerer, Nuremberg. XXVII. On the reflex action on the vessels of the pia mater, by Dr F. Krauspe, Insterburg. XXVIII. Some experiments on decomposition and the organisms concerned, by Dr V. Paschutin, from the Institute of Prof. v. Recklinghausen, Strasburg. XXIX. The pathological anatomy of the central nervous system. On atrophy of the nerve fibres and ganglion cells, by Dr R. Arndt, Greifswald. XXX. Smaller communications: (1) Some remarks on the paper of Prof. Boettcher on trau-

matic keratitis, with remarks on the plasticity of the cornea tissue, by Dr G. A. Hansen, Bergen in Norway; (2) Answer to Prof. Fr. Merckels' remarks on my treatise, by Dr G. Joseph, Breslau; (3) Trichina in Russia, by Dr Knoch, St Petersburg; (4) Remarks on the diet in chronic albuminuria, and the further treatment of this disease, by Dr F. A. Harteen, Cannes; (5) On the statistics of Dr Eyselein, by Dr W. Stricker; (6) On the form of the pathogenetic bacteria, by Dr Orth, Berlin; (7) Tables of the swine killed in Rostock in 1873, by A. Petri; (8) Medical and scientific obituary for 1873, by Dr W. Stricker. XXXI. Extracts and reviews. Annual report on medical affairs, the hospitals and the sanitary relations of Frankfort, by Dr W. Stricker.

XVIII. Hemicrania due to affection of the sympathetic (*Berger*).

—Several cases have already been published in which hemicrania seemed to depend on an affection of the sympathetic in the neck. Du Bois Reymond has shown that in a series of cases, the paroxysms depend on a tetanic contraction of the muscular coat of the vessels of the affected part; and that the region corresponds with the distribution of the sympathetic of the neck. In another set of cases the hemicrania has depended on an opposite condition of the vessels, an over-filling of them, due to paralysis of their muscular coats. Hence there seem to be two forms of hemicrania in which the sympathetic is involved. The present author gives a case in which the affection was evidently of the paralytic form. There was pain on deep pressure in the region of the first right cervical ganglion of the sympathetic. There was also pain on that side of the head, with signs of paralysis of the sympathetic similar to those obtained by division of the nerve in animals. There was great dilatation of the vessels of the right half of the face, and of the right ear; sweating on that side (ephidrosis unilaterialis), narrowing of the pupil, &c. In this case the pain in the head seemed to be due to the intra-cranial congestion; and to the same cause is ascribed by the author the retardation of the heart's action observed, an irritation of the regulating centres of the vagus being produced by the dilatation of the vessels. This case was treated by the continuous electric current applied to the region of the right sympathetic, the positive pole in the auriculo-mastoid fossa at a point corresponding to the superior ganglion, and the negative to the first dorsal vertebra. About 10-15 Siemsen's elements were used, and the application was from 1 to 2 minutes. After about 6 or 8 sittings, at the rate of 2 or 3 weekly, the patient showed signs of considerable improvement, and ultimately a complete cessation of the symptoms which the patient had suffered from for ten years. The author, however, takes care to note that though he has frequently galvanised the sympathetic, yet this is the only case in which the treatment was undoubtedly successful.

XX. Albuminuria in Epilepsy (*Huppert*).—The author finds traces of albumen in the urine first passed after epileptic attacks, whether slight or severe, but it is more abundant in the severe cases. In about half of the severe cases, and a smaller proportion of the slighter ones, tube casts were present after the attack, and these always disappear before the albumen. Red corpuscles were never found, but spermatozoa were in about a-tenth of the severer cases. After the epileptiform attacks of general paralysis there is albumen and red corpuscles in considerable numbers. In cases of acute mania he found albumen, but no blood.

XXII. Two Unusual Cases of Urinary Calculus (*Fürstner*).—These cases are instances of the occurrence of urinary calculi without very prominent symptoms during life. The first was a strong and active man of

72, who had suffered for some years from symptoms of vesical irritation, but not very seriously. A calculus was detected, and lithotripsy resorted to in its treatment. This resulted in the death of the patient, after five days of rather acute suffering. The bladder was intensely inflamed, and contained six uric acid calculi, each the size of a pigeon's egg. The ureters were also inflamed, and there were abscesses in the kidneys. In all these parts micrococci were discovered. The author views this case as a warning against operating in cases of calculus, where there are no severe symptoms. The man was comparatively well, and remarkably active five days before his death. The second case is also of interest; it is that of a man 62 years of age, who had during life no urinary symptoms, but died of phthisis pulmonalis. A calculus was found obstructing one ureter, which had produced dilatation of the pelvis of the corresponding kidney.

XXV. Mode of Determining the Cerebral Activity of the Insane (*Obersteiner*).—The author in this paper describes an instrument which he has devised in order to determine the so-called reaction time, that is the period which elapses between the time of receiving an impression through the senses, and the time at which the impression can be registered by a muscular action. The apparatus is very simple, and seems likely to be useful in determining the activity of the cerebral functions of the insane. The patient has only to listen carefully for the sound of a tuning fork, and whenever it is heard he pushes down a lever. The principle of the apparatus is also simple enough. The tuning fork which is used to give the sensory impression is also employed to register the time which elapses till the reaction is given. It does so by writing its vibrations on a movable plate of glass, blackened with soot, as is the plate in the sphygmograph. The lever which the patient depresses is the end of the tuning fork prolonged, and the effect of the depression is to remove the tuning fork from the movable plate. Thus, whenever the tuning fork is made to sound it begins to write its vibrations, and whenever the patient is able to register the fact that he has heard the sound, the fork is withdrawn. Hence the number of vibrations written gives the time from the emission of the sound till the reaction is registered. The author has experimented with his instrument both on sane and insane persons. He finds in sane persons that the average duration of the reaction time is 0.134 of a second. The time is elongated by anything which hinders the attention being concentrated, as exhaustion, sleepiness, headache, conversation going on in the same room, &c. He is able to modify his experiments, so that instead of a sound being emitted colours are made to pass into the line of vision. He finds that both in this case and the other, a certain amount of practice is required before the minimum reaction time is reached, but that through practice almost the same period is gradually arrived at by sane persons. He has not yet made many observations on insane persons, but so far he finds in most a prolongation either of the average or of the minimum reaction time. Prolongation of the minimum period in a number of experiments generally occurred in cases of grave disease of the nervous system, especially where there were indications of psychical debility. Lengthening of the average only indicates difficulty in fixing the attention, for when the attention is fixed then a minimum is obtained equal to that of sane persons. As might be expected, there is not generally prolongation of the minimum in the early stages of the various affections.

XXVI. Therapeutic action of Iodide of Potassium (*Kümmerer*).—The author in this paper gives a theory of the action of iodide of potassium and the salts of mercury. Those interested specially in such enquiries will

consult the original paper. Of more general interest is the treatment of synechia and specs on the cornea by iodide of potassium, and free iodine. The author himself was long troubled with these affections, and by the prolonged use of these agents he got rid of them. At first he used a solution of KI., but found that although at first there was no pain, yet in about four or five hours the pain was very intense. He ascribed this to the action of HI., which is formed by the decomposition of the KI. He therefore added bicarbonate of soda (one part), to iodide of potassium (two parts), and found that with this solution no pain developed. Later on he added free iodine to his solution. The author remarks that the treatment may be trusted to the patient, as it has to be carried on for a considerable time, but only a small quantity of the solution should be made up at once, as it is apt to decompose.

XXVIII. Experiments on Decomposition and the Organisms concerned (*Paschutin*).—Here we have a series of experiments made under the guidance of von Recklinghausen at Strasburg. They do not concern the question of spontaneous generation; but chiefly the influence of various gases on decomposition. Experiments were made first with muscular flesh, and second with infusion of muscle. It seems that in both cases the presence of oxygen was necessary for the continuous development of the usual organisms concerned in decomposition, bacteria and micrococci. When kept in nitrogen, hydrogen, carbonic oxide, carbonic acid, nitrous oxide, and ordinary illuminating gas, there was no apparent change in the muscle after nine or ten months except a slight difference of colour. But in the case both of muscle and its infusion, although when oxygen was excluded none of the ordinary forms of organisms developed, yet tyrosin formed in every case. Tyrosin is a product of the decomposition of albuminates; so it seems that decomposition can occur without the presence of these organisms, and without the presence of oxygen.

XXX. The Diet in Albuminuria (*Hartsen*).—It seems natural to prescribe to patients with albuminuria, a diet rich in albumen, inasmuch as they are losing albumen by the urine. But the fact has often been noticed that the albumen is increased in the urine during digestion. It seems in fact that the albuminous substances are often absorbed by the stomach and pass directly out in the urine. As meat is most quickly digested, and its albumen therefore passes most readily into the urine during digestion, it seems more rational to prescribe a diet chiefly composed of bread-stuffs and fat. It is proper also to avoid too much fluid, as the albumen is generally in proportion to the quantity of urine. Even milk is not good in too large quantities; it should be given moderately, and with bread. A pure milk diet does not stimulate the stomach enough, and there is an insufficient secretion of gastric juice to digest it, hence it should in all cases of adults, be given with some solid.

REICHERT AND DU BOIS REYMOND'S ARCHIV.

Nos. 3 AND 4.—1873.

CONTENTS.—I. On the cataphoric changes of the moist porous bodies, by H. Munk (Plate VI.). II. On supernumerary bones in the zygoma, by Dr W. Gruber (Plate VII.). III. On the semi-infundibulum inframaxillare, the sulcus mylo-hyoideus, and the two covering osseous bridges, by the same (Plate VIII.). IV. On the cervical vertebræ in birds of the species *Plotus*, by W. Dönitz (Plate XX. A.). V. On apnoe and the

action of an energetic current of carbonic acid on the mucous membrane of the organs of respiration, and on the influence of these on different forms of convulsion, by Dr W. Filehne. VI. On the separation of the digestive ferments, by Dr V. Paschutin (Plate X.). VII. Investigations on the physiology of the brain, by Dr E. Hitzig (Plate IX. B.). VIII. On the physiological action of bromide of calcium and other salts of calcium, by Dr A. Eullenberg and Dr P. Guttmann, Berlin. IX. Contribution on the action of nitrite of amyle, by the same authors. X. The physiological system of the sounds of articulate speech, by Dr J. F. Kräuter. XI. On the relative size of the intestinal canal and the chief systems of the body in man, and the vertebrata, by Dr J. Custor, Bern.

V. On Apnoe and its Influence on Convulsions, &c. (Filehne).— This paper is chiefly an experimental critique of a work by Brown-Sequard, in which that author made a number of rather extraordinary statements. It is well known that artificial respiration in animals produces by and by the condition known as apnoe, in which the animal ceases to make any independent respiratory movements, leaving its respiration, as it were, entirely to the apparatus. It has generally been considered that the cause of this apnoe is the superoxygenation of the blood. The muscular movements of respiration are supposed to depend on the irritation of the respiratory centres, by blood containing an excess of carbonic acid or a deficiency of oxygen; and when by artificial respiration an excess of oxygen is supplied, then the respiratory efforts cease, because this irritation is withdrawn. On the other hand, a deficiency of oxygen not only irritates the respiratory centres unduly (violent respiratory efforts of dyspnoea), but also renders the various other motor centres unusually sensitive (convulsions of extreme dyspnoea). It takes, however, a high degree of this deficiency of oxygen to raise the excitability of the respiratory and motor centres sufficiently to produce convulsions. But strychnia is known to increase the excitability of these centres to such an extent, that even with ordinary respiration the slightest sensible impression is sufficient to set up the most violent reaction. If, however, we reduce the normal excitability of these centres by the superoxygenation present in apnoe, then it should require a much larger dose of strychnia to produce the effects referred to. It is well known that artificial respiration which is pushed, so as to produce apnoe, interferes with the convulsions of strychnia poisoning, and this fact has been taken as confirmatory of the views just stated. Brown-Sequard, however, in the paper referred to, opposes these views. It is true that artificial respiration interferes with the development of the convulsions of strychnia; but it does so not from the superoxygenation of the blood, but from the irritation of the air passages by the air which is forced in by the bellows. The ends of the vagus, phrenic, and other nerves are irritated, and this irritation interferes with the action of the strychnia. Irritation of these nerves by other means similarly reduces the action of strychnia—the irritation of a current of carbonic acid applied to the mucous membrane of the air-passages or pharynx. These observations of Brown-Sequard appeared of great importance, because by this form of irritation he claimed to be able to avert the convulsions not only of strychnia, but of epilepsy, by this simple means of a current of carbonic acid. The present author, therefore, thought it worth while to repeat Brown-Sequard's experiments, and he denies his results almost *in toto*. He finds that the introduction of a current of CO₂ does produce a temporary stoppage of the respiration, but this is a reflex phenomenon, and has no relation to apnoe. A current of CO₂ on the other hand, makes no difference in the convulsions of strychnified or epileptic animals. The author, therefore, recurs to the old view of the production

of apnoe, and of the mode in which artificial respiration reduces the action of strychnia.

VII. Localisation of Function in the Brain (*Hitzig*).—The question of the localisation of function in the brain has now got into the controversial stage, and thither it must be out of our place here to follow it. The present author, who, along with Fritsch, was the first to use electrical irritation of the cortex of the brain to determine the localisation of its functions, here adds a number of new observations, and compares the localities of the dog's brain with the human.

VIII. The Physiological Action of Bromide of Calcium (*Eulenberg and Guttman*).—These two authors, in a former paper, endeavoured to prove, on experimental grounds, that the action of bromide of potassium depends on the potassium and not on the bromium. In the present case a similar statement is made in respect to bromide of calcium. The actions of CaBr, CaI., and CaCl, correspond, and they depend on the calcium which they all contain.

TRANSACTIONS OF The Medico-Chirurgical Society.

SESSION 1873-74.

EIGHTH MEETING, 3rd April, 1874.—Dr R. Scott Orr, President, in the chair.

Dr George Buchanan showed a patient on whom he had performed Wood's operation for the radical cure of hernia. Dr Buchanan also made some observations on the radical cure of reducible inguinal hernia. He divided the operations which had been used for this purpose into two classes—first, those which proposed to cure the deformity by plugging the abdominal rings, but leaving the rings and canal in their abnormal state; and, secondly, that which proposed to obliterate the rings and canal themselves. The first class of cases were usually operated on by what was called Wurtzer's operation, which consisted in invaginating a plug of skin on the point of the finger, pushing it through the external ring and up to the internal ring, and fixing it by Wurtzer's plug. This operation was first introduced into this country by Mr Spencer Wells. Dr Buchanan then showed and described the instrument used in this operation. With regard to the result of this operation, he believed that the experience of most surgeons was that the plug of skin gradually wore down, the hernia was reproduced, and the case remained as before. In two or three cases in which he had operated with this plug, the result at first looked very promising, but he did not know if the operation had in these been finally successful. Several modifications of this operation had been adopted. One consisted in using a bullet instead of

a plug ; another in placing sutures at the mouth of the invagination. But none of these methods had given promise of permanently satisfactory results.

Wood's operation had for its object to constrict and close the sides of the canal. This, in fact, was the principle involved in the operation. Dr Buchanan then gave a full and lucid description of this operation, his remarks being illustrated by diagrams. He also showed and described the several instruments used in performing the operation.

The President said that Dr Buchanan had made a somewhat difficult subject extremely interesting by his treatment of it, and he trusted that the surgeons present—he was sorry to see so few of them—would favour them with their experience in this matter. He took that opportunity of referring to the death of one of the oldest members of the Society, Dr Lyon, who had taken a deep interest in the progress of surgical and medical science, and who, had he been among them, would not have failed to contribute his experience in the discussion of such a subject.

Dr Morton said that he had made an experimental operation many years ago which involved a part of the procedure of Wood, but he did not make the attempt to catch the two sides of the ring. His operation in that instance appeared to be successful ; and in another instance he had tried it, but without being able to satisfy himself of the result. Mr Syme had before that period tried a plan somewhat similar to Wurtzer's method of invaginating the skin into the canal. Wood's method was a great improvement, showed much ingenuity, and he must have bestowed on it very great pains.

TUMOURS OF THE JAW.

Dr Buchanan also exhibited two tumours of the lower jaw, one arising from the exterior and the other from the interior, and necessitating the removal of half of the lower jaw. One of them was a marked specimen of the fibro-cellular or recurrent fibrous tumour. It commenced in the angle of the jaw, and gradually increased in size to that of a turkey's egg, invading the interior of the mouth. The other tumour was a distinct fibroid tumour, and in this fact its chief interest lay. It involved also the angle of the jaw, in a woman between 40 and 50 years of age. It grew from the interior of the jaw.

Dr Buchanan also exhibited an amputated leg, showing the pad formed on the stump after Syme's operation at the ankle-joint.

Dr Buchanan exhibited an absolutely circumscribed necrosis of the astralagus in a foot amputated for extensive disease.

Dr Alex Patterson said that it was certainly rare to find a tumour of the jaw exhibiting the fibro-cellular characters. He thought the case of necrosis of the astralagus very interesting, and almost unique.

Dr Joseph Coats, in answer to a question, said that the structure of the tumour to which Dr Patterson referred was distinctly what Paget called recurrent fibrous.

NINTH MEETING, 1st May, 1874.—Dr R. Scott Orr, President, in the chair.

Dr Alexander Patterson read "Notes of five cases of Compound Dislocation of, and Compound Fracture into, the Ankle-joint."

The President was sure that, especially to surgeons, the narrative of these cases of Dr Patterson's must prove very instructive and interesting. The

success which had attended the treatment was remarkable, when the very grave nature of the injuries was taken into account.

Dr Hugh Thomson said that though it was a considerable time since he had much surgical experience, yet he could well remember that such cases as *Dr Patterson* had related were in his time looked on as of the gravest character, and if a chance were given to save the limb, it was looked on as only a chance. It was in these circumstances only an exceptional case that did well. But it appears from *Dr Paterson's* case that "*nous avons changé tout cela.*" If the antiseptic system was to be credited with the success in these cases, it was beyond doubt a great improvement in surgical treatment.

Dr Donaldson mentioned one case which had come under his care in India before the introduction of the antiseptic system. In a cavalry charge both bones were smashed above the joint. The man, who, he might add, was a Mussulman, and therefore presumably a teetotaler, got better under the usual treatment.

Dr Graham, Paisley, had also a case in which no antiseptic treatment was employed, which got better. He had used simple water dressing.

Dr Patterson said that he never meant to affirm that such cases might not get well under other treatment; but he questioned if any other treatment would have yielded five consecutive cases of recovery.

The President said that, in this, the last meeting of the session, he had to congratulate the Society on the success which had attended these meetings.

Glasgow Pathological and Clinical Society.

FIRST SESSION, 1873-74.

FIFTH MEETING, January 20th, 1874.

Dr Cameron showed a case of HYPERÆSTHESIA. The patient, a young man, about three years ago ran the blade of a pair of scissors into the palm of his left hand. The cicatrix is still visible, and pain is elicited when pressure is made over it. Immediately after the accident, he complained of pain when the cleft between the middle and ring fingers was touched, or half the back of these fingers, including half the nail of each. Pressure at the inner aspect of the upper arm brought on pain. About five months ago he began to learn a trade in which he required to hold a chisel; this greatly increased the pain, and his fingers became cramped on the chisel. The skin on the back, near to the spinal column, and below the scapula now became very sensitive, and the patient experienced difficulty in carrying the left arm backwards. At the present there is tenderness over the second, third, and fourth dorsal spines, and there is sensitiveness over the right parotid region and angle of jaw. The fingers can be moved, but the grasp of the hand is impaired. There is

anæsthesia over the affected area of fingers, and a hot sponge is felt colder there than over healthy skin.

The Secretary showed, for Dr Renfrew, the heart of a girl, 13 years old, who had died from œdema of the lungs, associated with mitral disease. The foramen ovale was quite patent, admitting a large quill. There had never been cyanosis, but a cousin of the girl's had been cyanotic.

Dr Gairdner showed an ANEURISM opening into the bronchus.

Dr McCall Anderson showed two preparations of AORTIC ANEURISMS treated by galvano-puncture.

SIXTH MEETING, February 10th, 1874.

Dr Alexander Robertson showed a patient with SYPHILITIC PARALYSIS. A widow, 49 years old, suffered 18 months ago from a shivering, followed by almost complete loss of power in the *left* arm and leg: articulation was also affected. During the same day the *right* arm and leg shook violently. Two months later, droop of the left eyelid and dilatation of the left pupil appeared. The ptosis passed off after 6 months, but the dilatation continues. On admission to the Town's Hospital, 15 months ago, the paralysis had so far recovered; but she began to have general shaking fits every few days, lasting 3 or 4 minutes, with inability to speak, but without loss of consciousness, the head being turned to the left and the mouth also drawn to the left. Two months ago another hemiplegic attack, affecting the left side, was followed during convalescence by spasmodic twitchings of the right side of face, occurring twice a day for 3 days. Six weeks ago an ulcer—presumably syphilitic—appeared on the right thigh. At present there is still paralysis of the left side, not amounting however to a distinct drag. The sense of smell is more acute on the left side than on the right, but she says a few months ago it was the left nostril in which the smell was defective. The sight, although defective on both sides, is much worse on the left, and there is inability to roll the left eye up or down. The left eye appears usually more widely open than the other and its pupil is dilated. The left side of the tongue (at least in its anterior part) is very deficient both in common and gustatory sensibility, and its side is usually coated with fur, but there is no distinct atrophy and the movements are nearly natural. The masseter and temporal muscles act less powerfully on the left side. The muscles on the left side of the face are only slightly affected. The uvula points to the left. Hearing is very defective on the left side. Regarding the lesion as syphilitic, Dr Robertson thought it more likely to be multiple than single: the two attacks of left hemiplegia with shakings and twitchings on the right side he regarded as due probably to a gummatous nodule in the right half of the pons near the crus cerebri: he thought, moreover, that there may have been inflammation of the pia mater with effusion of lymph on the left side extending forwards as far as the left optic tract, and backwards to the seventh nerve.

Dr Thos. Reid said he had examined the eyes of this patient and had

found on the left side well marked optic neuritis with contraction of the disc. On the right side also there was slight neuritis.

Dr Thomas Reid showed a young woman, aet. 26, with pale ATROPHY OF BOTH OPTIC NERVES, due apparently to some cerebral affection. In November, 1871, she was admitted to the Eye Infirmary, and found to be unable to distinguish light and shade with her left eye, but could count fingers with the right. The loss of vision in right eye had been detected (accidentally) 12 months before admission, and in the left eye about 6 months before admission. The menstruation had been suppressed for 18 months, and she had been subject to vomiting and headache for two years. The ophthalmoscope shewed the left optic papilla to be pale, slightly atrophied, and the retinal vessels to be tortuous. The disease was less advanced in the right. She was treated with liquor strychniæ with some benefit, and the menses appeared on January 10th. From the beginning of January, 1872, she was sent to *Dr Finlayson* for treatment by the constant current, and a distinct improvement was rapidly noticed. On January 15th she could read No 19 Jaeger, and on 26th No. 16, the treatment continuing till she could read No. 12. Since then she has had from time to time febrile attacks, headache, and gastric irritation. The atrophy in the right is now as well marked as in the left. The improvement in the vision has been maintained. *Dr Reid*, in his remarks, referred especially to the improvement which followed the application of galvanism, and to the persistence of this improvement notwithstanding advancing atrophy of the nerves.

Dr Finlayson confirmed the remarks as to the improvement which followed the use of electricity in this case. This was perhaps more strikingly shown by the great improvement she experienced in finding her way along the street than by the test types. He used a current from Stöhrer's battery, never exceeding 10 elements, passed sometimes through the temples, sometimes from the occiput to the forehead, but usually the method pursued was to apply the positive pole to the forehead, and the negative to the angles of the orbits, sometimes gliding the negative pole along in these situations. The applications were always short, and were stopped at once on the occurrence of giddiness.

Dr Samson Gemmell showed a MYOMA OF THE UTERUS from a subject in the dissecting room. The tumour, the size of a foetal head, lay between the layers of the broad ligament to the right side of the uterus, having the round ligament and fallopian tube of that side firmly adherent to its surface and considerably elongated. The tumour was connected with the neck of the uterus by a very narrow pedicle which contained one or two large blood vessels. The tumour occupied the whole of the true pelvis but had formed no adhesions with any of the surrounding structures. The microscopic sections shewn to the Society demonstrated that in its essential structure it was muscular.

Dr Joseph Coats showed a preparation illustrative of STRANGULATION OF THE INTESTINE by twisting of the mesentery. He stated that one peculiar feature in the case was the extent of intestine involved. The small intestine from

about a yard beneath the duodenum to about the same distance above the ileo-cæcal valve was found engorged with venous blood, and distended with gas and fluid fæces. Its colour was almost black, and it had indeed very much the appearance of a loop of intestine from a case of strangulated hernia. At the upper and lower ends of this strangulated parts there was no distinct constriction of the intestine, but there was probably some obstruction of the bowel by the twist to be now described. The loops of engorged intestine were folded on one another in a somewhat complicated fashion, and it was only by untwisting the mesentery that they were disentangled. In fact it was apparent that the engorgement of the intestine was due to compression of the vessels from this twisting of the mesentery. Adhesions to the abdominal wall were found above and beneath the strangulated part. These adhesions did not constrict the intestine which was perfectly pervious. It was suggested that the portion of intestine, bound by adhesion at its upper and lower extremity, may have had its peristaltic action interfered with, and possibly by irritation increased. A tumultuous and irregular peristaltic action might account for the twists of the mesentery.

Dr Gairdner showed a preparation of an AORTIC ANEURISM, dissected in relationship to the nerves involved. The following is the history of the case :—

Ann M., æt. 30, a weaver, was admitted to the Infirmary on 12th Jan., 1874, in a state of complicated and extreme distress from spasmodic difficulty of breathing, amounting to suffocating paroxysms, with combined lividity and pallor, which were only very partially relieved by the inhalation of ether, and afterwards of nitrite of amyl. On carefully examining into the type of dyspnoea, it appeared to *Dr Gairdner* to present an appreciable amount both of laryngeal and bronchial spasm, but not enough of either to account for the fearfully dangerous-looking paroxysms, the well-marked pale lividity, and the evident apprehension of impending death, the last symptom being quite as obvious as in any case of true angina pectoris, although there was no positive cardiac pain. In the course of one or two rapid examinations, which were all that the patient's distressed state admitted of, it was ascertained that the cardiac sounds were normal (only rather louder at the left sterno-clavicular articulation than elsewhere), and the pulmonary signs at least not so far abnormal as to account for the symptoms. There was, however, a little comparative dulness on percussion in the lower left back, and a slightly impaired respiratory murmur on the left side all over as compared with the right. There was also a rather ill-defined, relative dulness on percussion at the left sterno-clavicular articulation, but no pulsation in jugular fossa, and no well-marked inequality in the two radial pulses, or in the pupils. The left pupil was once or twice noticed to be a little smaller than the right, but the difference was not constant. The epiglottis was normal to the touch; the voice and cough perfect, or only weak; laryngoscopic examination not possible under the circumstances. Such exploration as could be made of the posterior

mediastinum detected no positive sign of a tumour there, nor was there any bronchial or tubular respiration, in an abnormal sense, over any part of either lung. The sputum was frothy without blood, and such râles as were present were those of bronchitis. The patient died on the 19th January. Dr Gairdner regarded the complex neurosis in this case as bearing partly in the direction of laryngeal and bronchial spasm, and partly of angina pectoris with orthopnoea. The lividity showed that the aëration of the blood was much interfered with, while the access of air to the lungs, though probably somewhat obstructed, was still sufficiently free to be consistent with life. Dr G. accordingly formulated the diagnosis as follows :—*Suffocative paroxysms, attended by pale lividity, and extreme sense of impending danger to life, but not either with laryngeal or bronchial spasm corresponding with the apparent intensity of the dyspnoea.* Obscurely dull percussion, with relatively diminished respiratory murmur on the left side of the chest, and perhaps also at left sterno-clavicular articulation. Diagnosis doubtful. *Qu. Aneurism or mediastinal tumour.*

The dissection shown to the society had been executed with great care by Dr Samson Gemmell, who gave the following report :—

1. Left pneumogastric ran over the centre of the aneurism, and was firmly adherent to it.

2. Left recurrent was given off a little below the centre of the tumour, and became lost in the aneurism, on the under side of the arch; but was again discovered behind, lying between the trachea and the aneurism, from which it ascended to the larynx. Its fibres were much flattened out, but it did not appear to be atrophied.

3. The left side of trachea was firmly adherent to the aneurism, the sac of which was very thin in this situation. Left bronchus was pressed on and flattened.

4. The tumour projected into the lumen of the pulmonary artery, just at its bifurcation; both the right and left pulmonary arteries were pressed on, the right especially so.

5. The deep cardiac plexus had, in all probability, been unduly pressed upon.

6. The laryngeal muscles appeared equal on both sides.

7. The structures on the right side were normal in all respects.

Dr Joseph Coats showed, under the microscope, two specimens of MILIARY ANEURISMS of small cerebral arteries, such as have been described by Messrs Bouchard and Charcot. One was a characteristically sacculated aneurism, and the other a fusiform dilatation, obviously of more recent formation. They were removed from the brain of an old man who died of cerebral hæmorrhage.

Dr Alexander Robertson said he had also met with these aneurisms in cases of cerebral hæmorrhage.

Dr H. C. Cameron showed RICE LIKE BODIES from a bursal swelling of the wrist and palm.

SEVENTH MEETING, March 10th, 1874.

Dr Joseph Coats showed a heart in the recent state, which contained in the left auricle a large GLOBULAR VEGETATION. The case was one of contraction of the mitral orifice, the aperture only admitting the tip of the finger. The vegetation was about three inches in length, of an elongated form, and attached along the left wall of the auricle so as just to reach (but not obstruct) the auriculo-ventricular orifice. It was pale externally, and contained a central cavity, from which a brownish juice escaped on tearing the wall.

Dr Alexander Robertson showed an AORTIC ANEURISM, just removed from a patient on whom he had operated with a degree of apparent success by galvanopuncture, but the details of the case he reserved for condensation and report subsequently.

Dr D. N. Knox showed three dissections which he had made, showing various kinds and degrees of variation in the generative organs of HERMAPHRODITE bullocks. In the first of these the male type predominated. Both the testes were present, but only one was found in the scrotum, the other (much smaller than usual) being in the inguinal canal. The penis was reduced to a mere stump, and projected posteriorly, like an enlarged clitoris. The urethra opened at the extremity of the penis by an orifice so small as only to admit a crow-quill; its total length was about nine inches, and it passed straight forwards to the bladder. The prostate did not embrace the neck of the latter. About four inches from the root of the penis, in the floor of the urethra, was a well-marked *verumontanum*, with three small openings on it; of these, the two placed laterally led into the *vasa deferentia*, while the central one opened into a large oval-shaped fibrous bag about 12 inches long and $4\frac{1}{2}$ inches across in its widest part. About three inches from its anterior extremity there was a constriction, after which the bag again dilated, to terminate in two large cornua which curved outwards along the anterior border of the broad ligaments, and had long tapering blind extremities embedded in the substance of the ligaments. The *vasa deferentia* and *vesiculæ seminales* were embedded in the lateral walls of this cavity as far as the constricted portion, from which point they turned outwards to reach the inguinal canals. They thus corresponded, in their relation to the cavity, to the ducts of Gaertner in the cow. Around the neck of the cavity was placed a small prostate gland, consisting of two lobes, joined by a narrow isthmus. No trace of an *os uteri* was found on the interior of the bag, which thus corresponded to an utero-vaginal cavity, or an enlarged *sinus pocularis*. The second specimen presented externally the normal female type. The body of the uterus was also apparently normal, but very small. In the broad ligament of the right side, female organs were found, viz:—fallopian tube, ovary, and duct of Gaertner terminating in *paroophoron*. On the left side the organs were male; the testes being large, the *vas deferens* and *epididymis* well marked.

Dr H. C. Cameron showed a young man who had been admitted to the Eye Infirmary with various NERVOUS LESIONS following a fracture of the skull.

The sight of the left eye was lost, and there was atrophy of this disc; but on the right side ulceration of the cornea threatened to destroy the use of this eye also. This ulceration was not due to exposure of the eyeball, but seemed to be related directly to a lesion of the fifth nerve on this side. The nervous lesions had been carefully gone into by Mr H. E. Clark, who had made the following report:—

Paralysis of the sixth nerve, right side. Slight loss of power of the right motor oculi, as evidenced by faint ptosis and imperfect movements of the eyeball. The superior division of the nerve seemed to be alone affected.

Total loss of the sense of hearing on the right side. (?)

Incomplete paralysis of all three divisions of the fifth nerve on right side. (1st Division) Total loss of sensation of the conjunctiva. Ulceration of the cornea from want of due nervous influence, this being probably due to injury to the sympathetic filaments distributed with the nasal nerve, rather than to the injury to the proper filaments of the fifth. Partial loss of sensation of forehead. (2nd Division) Partial loss of sensation over the right side of the face; the patient feels any touch much less acutely than on the sound side. (3rd Division) Patient says he cannot masticate so well with that side as with the other. There is loss of sensation of the tip and sides of the tongue in about the same degree as there is loss of sensation on the face. There is *no loss of the sense* of taste over the anterior part of the tongue: indeed, the man asserts that he tastes better with that side than with the other. The inference to be drawn from the latter circumstance is, that the gustatory branch of the fifth is not the nerve of special sense of the front of the tongue.

Deviation of the point of the tongue toward the paralysed side, from implication either of the ninth, or lingual branch of the facial.

Deviation of the point of the uvula towards the sound side, either from injury to the facial or its Vidian branch.

All these signs were better marked when the case was first seen than now.

Dr Thomas Reid showed a woman fifty years of age with EPITHELIOMA of the orbit. Eighteen years ago she received a scratch at the inner extremity of the lid, and for fourteen years there had been an irritable sore. *Dr Reid* saw her three years ago, at which time there was a warty ulcer. Two years ago the whole lower lid had become destroyed and the margins of the upper lid were also affected; the margins showed the thickened character usual in epithelioma. Sudden inflammation of the orbital tissue now supervened with protrusion of the eyeball, this was followed by destruction of the orbital tissue, the eyeball hanging loosely supported by its muscles; the bones of the orbit had also become exposed, and as it was uncertain how deeply the disease extended, *Dr Reid* refrained from performing any plastic operation. On account of some favourable experiments being made at this time with picric acid he gave her some to apply to the sore. Two or three months ago she returned again to the Eye Infirmary, and the saturated solution of this acid was now applied more systematically, and chiefly to the raw edges, with the effect of inducing a more healthy action and a tendency to contraction. The health also at the same time underwent an improvement. *Dr Reid* also showed numerous microscopic sections and drawings to illustrate the development and varieties of the tubular form of epithelioma and explained his observations and opinions on this subject.

EIGHTH MEETING, April 14th, 1874.

Dr Finlayson showed two children, sisters, whose skin rose in WHEELS RESEMBLING URTICARIA on any slight irritation, so that their names, for ex-

ample, could be thus written. In the elder of the two (aged 9 years), this peculiarity had been noticed by him two years ago ; in the younger (aged 7 years), it did not then exist but was now very marked. They did not seem subject to urticaria apart from local irritation. Dr Finlayson thought these cases of importance, as showing a family tendency to this peculiarity, and that it was not congenital. Several members referred to cases more or less similar, in some of which the peculiarity was known to have passed off.

Dr Gairdner showed the dissection of an ANEURISM. The patient had suffered from hoarseness, with imperfect closure of the glottis in coughing, and there had been some difficulty in swallowing. A pulsating tumour was found at the first and second ribs, below the left sterno-clavicular articulation. The respiratory murmur was feeble on the left side, and puerile on the right. The pulses were at first equal, but the right became weaker. There was at first no orthopnoea, but this afterwards appeared to some extent ; and some approaches to insensibility had been noticed. At first there was no blood in the spit, but some streaks appeared later. The pupils were large, the left perhaps larger. The patient died rather suddenly on rising to smoke. Some blood came from the mouth. The dissection of the tumour was made by Dr Samson Gemmel. The aneurism involved the transverse arch, arising from its posterior and upper aspect. It had burst into the trachea just above its bifurcation, and the opening was blocked with clots. The left bronchus was much pressed on. The oesophagus was adherent to the tumour, and also pressed on. The left pneumogastric was free ; but the left recurrent became lost at the back part of the tumour, apparently running into the aneurism, but traceable above this to its usual distribution. The branches to the superficial cardiac plexus were so adherent that they could not be dissected, and the branches to the deep plexus were also much involved. The pericardium was firmly adherent to the left pleura ; but the anterior and posterior pulmonary plexuses seemed normal. The innominate artery was adherent to the sac of the aneurism, but quite patent ; the left carotid was impervious. Dr Gairdner contrasted the dyspnoea and nervous lesions in this case with a more complex case previously shown the society.

Dr Alexander Robertson presented a patient with GENERAL PARALYSIS, and, in some remarks, referred to the great impairment of electric irritability of the muscles in such cases as indicating an implication of the whole nervous system. Some seven or eight years ago he tested this point in fifty hemiplegics, and arrived at the conclusion that the diminution of electrical irritability was proportionate to the degree of atrophy of the muscular substance. Where nutrition was well maintained there was no appreciable difference between the sound and paralysed sides. Dr Robertson also gave various reasons for dissenting from the notion of this affection being due to sexual excess. These will be found worked out in a paper contributed by him to the number of this *Journal* for February, 1873 (Vol. V., new Series, p. 230).

Dr Thomas Reid showed a preparation and microscopic sections of a GLIOMA OF THE RETINA. A girl of three and a-half years was admitted to the Eye Infirmary, in April, 1873, unable to distinguish light and shade with the left eye. The defect had been noticed for three months. The pupil was found dilated and fixed ; and, on examination, there was a yellowish reflection from the posterior and lower part of the fundus. This was evidently an exudation behind the retina, and was supposed to be probably cancerous ; but, as the parts were quiescent, a trial of treatment by tonics (iodide of iron) was decided on, and for six months little change occurred. In November, evidence of increase in the growth appeared, as it seemed then to occupy the whole posterior half of the fundus, and to approach even to the lens. Increased tension and distension of the coats of

the eyeball supervened, and the general health suffered. Enucleation was therefore determined on, and performed under chloroform in the middle of December. On examining the eye, the disease seemed to have extended along the optic nerve for about three lines, giving this part of the nerve a bulbous appearance, its diameter being nearly doubled. The nerve had been cut behind the diseased portion. After hardening in chromic acid, the cavity of the vitreous body, and the retina were found occupied by a semifluid substance abundantly supplied by blood vessels. The fluid presented brain-like cells characteristic of glioma of the retina. Only a trace of the retina was found at the optic nerve entrance; the fibrous structures being considerably hypertrophied, and projecting inwards. At various parts, but chiefly at the anterior part of the ciliary region, the choroid was found hypertrophied, showing encroachment of the glioma and traces of inflammatory action. Longitudinal sections of the hypertrophied part of the optic nerve showed the connective tissue to be replaced by gliomatous cells. After the operation, the fever subsided, and the child's health improved; but in fourteen days there was enlargement of the submaxillary gland, which, however, subsided under the use of iodide of iron. Still later, there was some swelling with pain and tenderness, at the stump; but this also passed away in a week, and the child's health improved.

Dr Reid also showed a patient, and described the ophthalmoscopic appearances in a case in which he had diagnosed TUMOUR OF THE BRAIN.

NINTH MEETING, MAY 8TH, 1874.

Dr McCall Anderson showed a man who had recovered almost completely from an attack of SYPHILITIC PARALYSIS. The eyesight had been seriously affected on two separate occasions, and was still imperfect; the retina was congested, and the vitreous turbid. Three years ago, after several shivering fits, loss of power in the left side of the face set in, accompanied by some affection of the left leg. Pain in the head, chiefly on the right side, giddiness, and occasional vomiting, were also complained of. *Dr Anderson* thought the paralysis of the face was due to some affection of the fifth nerve rather than of the seventh: the man's ability to close the eyelids (although he could not close the left if the right was kept open), his ability to blow out air and to bring back food from between the cheek and gums, the absence of any marked deviation of the tongue, and the normal response of the facial muscles to galvanism, pointed, he thought, to an affection of the fifth nerve. The pain and other symptoms agreed with the notion of some cerebral tumour. Its nature was presumed to be possibly syphilitic from the existence of a node on the left tibia, and the cicatrices of an old tubercular eruption on the skin. Under treatment by iodide of potassium the patient recovered almost completely, a mere trace of the paralysis still existing.

The Secretary showed for *Dr Alex. Patterson* a specimen of simple FATTY TUMOUR.

Dr William Macewen showed a FATTY TUMOUR, portions of which had undergone calcareous degeneration.

Dr Hector C. Cameron showed a FATTY TUMOUR which had ulcerated on the surface in consequence of pressure it had sustained.

Dr Finlayson showed a specimen of JAUNDICED URINE, loaded with tube casts. Since reporting on this subject in the *Glasgow Medical Journal* for January, 1874, he had examined the urine in twelve cases of jaundice. In only two did he fail to find casts, and in one of these the jaundice was passing away, and in the other the search was not quite satisfactory. In two of the cases traces of albumen seemed to be present; but in eight cases the casts were more or less abundant, without any albumen being appreciable. *Dr Finlayson* referred to Professor Nothnagel's paper as the first

in which this subject was prominently discussed, although references had been made to it by Dr George Johnson and others. Nothnagel first announced the almost invariable presence of tube casts in the urine if it were deeply jaundiced, and likewise the curious fact of the absence of albumen in three-fourths of such cases. Dr Finlayson's observations, although on a much smaller scale, had confirmed Nothnagel's statements; and the occurrence and abundance of the casts seemed due to the depth of the jaundice *per se*, apart from any special cause of this affection. In discussing the cause of the occurrence of these casts, Dr Finlayson said he thought the small coloured particles found in the urinary sediments might irritate the tubules and cause local exudations sufficient to form casts, although insufficient to cause albuminuria; and he referred to a case of renal calculus which he had recently observed, where, during renal irritation, desquamation of epithelium and moderately abundant casts were associated with no albuminuria at first, and but little altogether. Dr M'Call Anderson thought it would be important to study this question in relation to the different causes of jaundice, and particularly in those cases due to passive congestion of the liver from heart disease.

Dr Donald Fraser, of Paisley showed a large CALCULUS passed *per urethram* without any assistance, by a widow aged 39, after nine days' severe suffering. It was tapering and pear-shaped, and measured about three inches in length, and three inches and five-eighths in diameter at its broad end; it weighed one ounce. For several months she had suffered from incontinence of urine. This symptom had become much diminished since the passage of the calculus, as she was now able to retain her urine for an hour or so. Dr Fraser referred to a somewhat similar case recently recorded in the *British Medical Journal*.

Dr Joseph Coats showed microscopic section from two cases of CALCAREOUS DEGENERATION of the middle coat of arteries. One of these was from a femoral artery, in a case in which there had been a popliteal aneurism. There was atheroma of the larger arteries, and calcareous degeneration of the middle coat in the femoral and its branches. The degeneration began in patches, and must have rendered the affected portion rigid and less able to resist pressure from within. The condition contrasted with that met with in atheroma, in which the internal coat is at first alone affected. When calcareous degeneration occurs in atheroma, it also affects the altered internal coat, whereas in the specimens shown the lime salts were present only in the middle coat. The rigidity of the radial and other arteries may be due to this form of degeneration rather than to atheroma. Although, as in the case shown, atheroma of the larger arteries probably coincides frequently with calcareous degeneration of the middle coat in the middle. This, at least, is stated by Rindfleisch in his *Pathological Histology* to be the case.

Dr Cameron showed (I.) a RECURRENT FIBROUS TUMOUR removed from the abdominal walls of a female. It had now been removed six times during a period of thirty years, on five occasions by the late Dr William Lyon of Glasgow. The woman is in good health.

The tumour was remitted to the consideration of a committee.

(II.) A TUMOUR from the right labium majus of a woman in middle life. It appeared to consist of skin which was rugose, and folded on itself, much resembling the skin of the scrotum. It was pear-shaped, and was slightly ulcerated at its surface from friction. It was attached by a very narrow round pedicle two and a-half inches in length.

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Original Articles.

I.—ALBUMINURIA, A SEQUELA OF SMALLPOX.

By SAMSON GEMMELL, M.B., *Medical Superintendent, City of Glasgow Smallpox Hospital.*

AMONG the sequelæ of smallpox, affections of the kidney, although possessed of many points of special interest, seem to have attracted comparatively little attention; and as, during the recent epidemic in Glasgow, several opportunities were afforded for the study of this sequela, I have thought it not unworthy of a brief record. Authors, both English and foreign, are singularly silent on the subject. The field of inquiry has no doubt been much limited by the protecting and modifying influence of vaccination, and by the fact that it is only during certain epidemics that renal affections are apt to supervene. This latter circumstance explains why it had not been observed in the Glasgow Smallpox Hospital prior to the epidemic of 1873-74.

This sequela, indeed, seems to be little known, for after extended researches in the literature of both renal disease and smallpox, I have discovered only one observer—Cartaz—who has attempted to give anything like even a meagre sketch of its clinical history. Many authors call attention to albuminuria in smallpox, but it is to the albuminuria which is a *complication* and not a *sequela* that they refer. This sequela, however,

although it does not occur with anything like the same frequency as after scarlet fever, and even although it appears only in certain epidemics, is still of such frequency, and fraught with so much danger, as to render it absolutely necessary that the physician should be on his guard. Nothing is more common than oedema from pure debility in convalescence from smallpox, and, aware of this fact, the physician may pass over a case lightly without ever thinking of examining the urine, and in forty-nine cases out of fifty he may be right, but in the fiftieth he may be wrong, and lay himself open to the charge of ignorance or negligence. In all cases of oedema after smallpox, no matter how slight, the urine should be carefully examined, with the full conviction that the swelling may be due to a lesion of the kidney, and a remembrance of this possibility may lead also to a correct interpretation of other trifling symptoms which otherwise might be passed over. The occurrence of albumen in the urine during the course of an attack of smallpox has been noted by many observers, and they are all agreed that it is most apt to appear in confluent cases, especially of a hæmorrhagic type. Thus, Abcille found it to occur once in 17 cases; Martin Solon, 5 times in 11 cases; and Parkes once in 5 cases. But in all these the albuminuria was an early and transitory phenomenon. Rayer, however, in his classical work, "*Sur les maladies des Reins*," mentions a case of albuminous nephritis occurring during convalescence from confluent smallpox, but no details are given; and Cartaz, in an article entitled, "*De l'albuminurie dans la variole*," in the *Lyon Médical*, for 1871, records 7 such cases, two of them, however, being very slight and transitory.

Albumen may appear in the urine at three different stages of an attack of smallpox. It may occur during the course of the primary fever, just as in pneumonia or any other acutely febrile disease. It is present of course in hæmorrhagic smallpox when there is hæmaturia. But in both of these cases it is an early phenomenon, in the former it is usually very transitory and by no means copious, and in neither need we infer any serious disorder of the secreting apparatus of the kidney. Again, albuminuria may occur during the period of desiccation, and it

is to this form I wish to direct attention. Cartaz is the only author who has given anything like special study to the subject, but his cases were few (only 7), two of them were very slight, and he had no *post mortem* examination, although he had one death. His observations were confined to 106 cases of smallpox, and his deductions were that in confluent smallpox albuminuria, during convalescence, occurs once in every 5 cases, and that it is usually transitory, but may be permanent. My own observations would give a lower proportion than this, but the cases were altogether of a much more pronounced and definite character than those reported by Cartaz. The total number of undoubted cases of smallpox admitted to the City of Glasgow Smallpox Hospital during the period of observation was 1058, and of these 20 presented well-marked renal sequelæ. Albumen was detected in many of the other cases during the early period of the attack, but for present purposes all such observations are set aside. Of the 1058 cases, 878 were vaccinated and 180 unvaccinated. Of the vaccinated, 13 were followed by albuminuria; and of the unvaccinated 7. Only 16 of the cases were followed out in detail, the others occurred at a period when their thorough investigation was impossible, but in their main features they were identical with those reported. A synopsis of the cases is appended.

Period of onset of the Albuminuria.—This is one of the first facts which arrests attention in relation to these cases. The average of the whole gives the 25th day of the illness as the date at which the albuminuria was first detected, the earliest being the 18th, the latest the 31st. It thus occurred when desiccation was either in progress or just completed. This observation quite agrees with that of Cartaz. In all his cases it supervened on desquamation. I cannot state positively that albumen may not have been present for a day or two prior to its detection, but in at least 3 of the cases the urine had been tested within five days from the first appearance of the dropsy, and found absolutely free from albumen. The period of onset thus affords an analogy with scarlatinous albuminuria, although in small-pox the renal disorder occurs perhaps somewhat later than in scarlet fever.

Relation of the severity of the attack of Smallpox to the occurrence of Albuminuria.—In scarlet fever there is a general impression that the mild cases are more liable to dropsy than the severer forms. The reverse obtains in smallpox. Of the 20 cases, the rash was confluent or semi-confluent in 13 and discrete in 7, and these figures gain additional significance when we remember that the discrete cases admitted were at least three-fourths of the whole. It is, therefore, quite apparent that vaccination by modifying the attack of smallpox should tend to obviate the occurrence of albuminuria. In 878 vaccinated cases the sequela was observed 13 times or in 1·4 per cent., while in 180 unvaccinated it occurred 7 times or in 3·8 per cent. Of the 13 vaccinated cases in which the sequela appeared, 3 had very poor marks.

Age of those attacked.—All the cases occurred in young subjects, the ages ranging from 5 to 21, although one-third of the patients admitted to hospital were above this age. This fact allies the cases with the acute forms of Bright's Disease, which are notoriously most prevalent in early life. With two exceptions, the sequela occurred in males, and, although acute Bright's Disease is relatively more frequent in males than females, still, in the present instance, when the females admitted were 532 and the males 526, the proportion seems unduly large, and might give some colour to the notion of a predisposing cause.

Symptoms.—There were, as a rule, no very marked general symptoms. The temperatures were recorded night and morning in many of the cases, but at no time was there any acutely febrile movement. The temperature rarely exceeded 100° F., and, indeed, in most cases, it was quite within the normal limits. When there was any febrile disturbance, however, it was at the commencement of the attack. In one or two cases there was pain in the lumbar region, with sickness and vomiting, but this was exceptional. As a rule, *malaise* and a disinclination for food were the only symptoms complained of. In all the cases, dropsy was a prominent feature, usually sudden in its accession, and often the first indication of renal disorder. This dropsy must, of course, be carefully distinguished from the oedema already.

spoken of, which is so apt to occur in convalescence from smallpox from pure debility.

The urine, as a rule, was scanty at the onset, although in three cases (Nos. 5, 7, and 12) the quantity was abundant all through; while in others (Nos. 2 and 3) there was almost total suppression. The density was usually high—1024—1030. There were, however, some exceptions to this, *e.g.*, case 5 had a sp. gr. of 1010, and case 7 of 1015, but in both of these the urine was abundant, while in cases 13 and 14 the urine, though moderately scanty (20 and 25 oz. in the 24 hours), had a density of 1014 and 1016 respectively. Blood was present in perceptible quantity in all the cases except Nos. 1 and 15, while in four (Nos. 4, 5, 9 and 11), it was so copious as to give the urine a very pronounced character. Albumen was copious in every case, in many forming $\frac{1}{2}$ or $\frac{3}{4}$ of the whole on heating, and in one case (No. 2) the urine solidified with heat. Tube casts were very plentiful in all, chiefly epithelial, granular, and blood casts. The quantity of free renal epithelium was always great. Crystals of uric acid, oxalates, and triple phosphates were observed on several occasions. Amorphous urates were very rare, and at no time was there any pus detected.

Treatment.—Heroic measures, unless in special circumstances, are entirely out of the question in nephritis following smallpox. The affection of the kidney is itself an indication of lowered vitality, and any attempt to combat it by the usual antiphlogistic means will only tend to reduce the patient further. The first indication is to establish the urinary secretion by as gentle means as possible, and whenever that is effected, the whole attention should be directed to the improvement of the general health. In cases where the urine was abundant, and where there were no threatening symptoms, even although the dropsy was considerable, I contented myself with putting the patient on a good diet, keeping his bowels regulated, and administering tonics, such as iron, quinine, and nitro-muriatic acid. Generally this was followed by the most beneficial results. Small doses of cod liver oil were also given. When the dropsy

was great, and the urine scanty, recourse was had to various methods of treatment, such as vapour baths, wet packs, mild purgatives, and diuretics. Ultimately I came to rely almost entirely on the wet pack, combined with an occasional slight purgative. I cannot, indeed, speak too strongly in favour of this treatment by packing. It seems to answer a greater number of indications than any other. It frequently happened that the patients were restless, uneasy, and quite unable to sleep, and in such cases the pack afforded the greatest relief, not only rendering the skin soft and moist, but also increasing the flow of urine, and inducing refreshing sleep. Many, indeed, fell asleep in it. The pack was applied once a day from one to three hours, according to the feelings of the patient. Whenever the function of the kidneys was established, the pack was omitted, and the tonic treatment commenced. If the pack failed to act, recourse was had to diuretics and dry cupping over the loins. Only once was wet cupping resorted to. The case had resisted all other modes of treatment, and as the urine was scanty, and contained much blood, Dr Russell, who saw the patient, suggested wet cupping. Eight ounces of blood were taken from the loins, and next day the urine had doubled its quantity, and the blood had in great measure disappeared. The case ultimately did well. Where uræmic symptoms supervened, the bowels were well acted on, mustard was applied to the back of the neck, while the feet and legs were bathed with hot water containing a little mustard. Lung complications were treated by poultices and diffusible stimulants, as well as by posture.

Results.—Of the 20 cases, five died, one in uræmic coma, the other four from cardiac and pulmonary complications. One of the latter had also an uræmic attack, but recovered from it. Of those that ultimately improved, three had uræmic convulsions, and one a severe intercurrent attack of erysipelas. Only three were dismissed from hospital with the albuminuria quite removed, all the others, although very much improved, went out with the albumen and tube casts persisting. Several of them

were under observation for two months, and one or two presented themselves for examination at a subsequent date, when the urine was still found to contain albumen. The microscope too, in many instances, clearly indicated that the disease was becoming chronic. It is worthy of note that only one case was complicated with boils, but these could have no relation to the albuminuria, as they appeared at a subsequent date.

Pathological conditions in the kidney.—While recognising that smallpox may be the starting point of a renal disorder, authors are at variance as to the conditions which result in the kidney. Rosenstein, following Beer, who observed the epidemic of 1858, in the *Charité*, in Berlin, describes the changes as identical with interstitial nephritis, and states that if there is an intratubular lesion it is secondary, and a consequence of the other. Jaccoud, on the other hand, while he admits the possibility of an interstitial nephritis, holds that in the majority of cases the lesion is simply a catarrh, chiefly of the straight tubes, and accompanied by slight desquamation. In his opinion, this catarrh bears no relation to Bright's Disease. Both observers, however, are agreed that it is in hæmorrhagic cases that the kidney is most apt to suffer. The results of the late epidemic in Glasgow do not agree with either of these observations. The examinations of the kidney were confined to three cases, and although no generalization can be ventured on from such scanty data, still the uniformity of the pathological condition in these cases, and the identity of their clinical history with those that survived, entitle us, I think, in at least entertaining a strong probability that the conditions were much the same in all. None of the 20 cases were of a hæmorrhagic type, and in the 3 instances in which examinations were made the kidneys presented, in a well marked degree, the conditions known as acute Bright's Disease, the acute desquamative nephritis of Dr Geo. Johnson. In one instance, however, there was, in addition to the intratubular change, slight increase in the stroma over limited areas, but it was quite a subordinate feature. The kidneys were large, in one case the two glands weighed 15 oz., the cortex was hypertrophied in all and the microscopic changes were markedly intratubular. The clinical histories too accorded

well with the notion of acute desquamative nephritis. The sudden accession, the great renal desquamation, and the frequent occurrence of uræmia all point to this.

Etiology.—While prosecuting inquiries as to the probable cause of the attack, very minute investigations were made into the antecedents of the patient, as well as to the occurrence of scarlatina or other diseases apt to induce changes in the kidney. The occupation of the patient also received full consideration. The results in most cases were negative, however; only two had histories of scarlet fever many years before. It is not my intention, however, to enter into the vexed question of causation. A fact worthy of note is that the albuminuria occurred for the most part during the winter and spring, and, although the weather was very mild, it was wet and damp. I am not inclined to attribute much to this circumstance, and we need hardly wonder that in a disease depending on a morbid poison, where the function of the skin is so crippled, and the congestion of internal organs so great, renal affections sometimes manifest themselves. The only wonder is that they are so rare.

SYNOPSIS OF CASES.

(1.) H. H., aged 11, unvaccinated, admitted October 19, 1873, with semi-confluent smallpox. Convalescence. On the 29th day accession of dropsy, with scanty albuminous urine, containing granular and epithelial casts; no blood apparent; sp. gr. 1020-1028; uræmic convulsions; effusion into pericardium and pleuræ; death.

Sectio.—Two ounces of serous fluid in the pericardium and a considerable quantity in either pleura, but no inflammatory appearances; lungs congested; kidneys large and much congested; cortex hypertrophied and mottled.

(2.) J. C., aged 6, well vaccinated, admitted December 3, 1873, with discrete smallpox. Desiccation. On the 27th day, dark coloured scanty urine, which solidified on heating; sp. gr., 1030; great desquamation; uræmic convulsions; death.

Sectio.—*Kidneys* weigh 8 oz., capsule easily detached, surface of the gland smooth, stellate vessels gorged with blood; section

shows much congestion; ecchymotic spots in the cortical substance which is increased. *Microscopic examination* reveals great proliferation and desquamation of the epithelium, chiefly confined to the cortical substance.

(3.) T. S., aged 5, unvaccinated, admitted December 9, 1873, with semi-confluent smallpox. Convalescence. Accession of dropsy on the 24th day, with almost total suppression of urine; sp. gr., 1028; albumen three-fourths; granular and epithelial casts, blood corpuscles and renal debris; pleuritic and pericardial effusion; death.

Sectio.—The *kidneys* only examined. Together they weighed 6 oz., greatly congested, and cortical substance hypertrophied; tissue very firm. *Microscopic examination*—Epithelium very granular, and large numbers of tubules completely choked up; many straight tubes filled with granular matter evidently washed into them. No apparent interstitial change.

(4.) M. H., aged 8, vaccinated, admitted December 15, 1873, with a mild attack of smallpox. Desiccation and complete convalescence. Sudden general dropsy on the 25th day, with scanty albuminous urine. The urine examined three days before, and found to contain no albumen; chocolate sediment; sp. gr., 1026; blood and epithelial casts, with much free renal epithelium and many blood corpuscles. Accession of cardiac and pulmonary symptoms; death. P.-M. refused.

(5.) T. L., aged 21, engineer, well vaccinated, admitted December 27, 1873, with discrete smallpox. Convalescence. On the 27th day rigors and pain in the loins; urine abundant, 50 ounces in the 24 hours, with a chocolate sediment; sp. gr., 1010; albumen one-third; epithelial and blood casts, with much debris. Intercurrent attack of erysipelas 14 days afterwards, with great increase in the blood and albumen. Gradual improvement under treatment, and dismissal March 14, 1874; the albumen and dropsy quite gone, but casts, hyaline in character, persisting.

(6.) J. M., aged 15, lemonade maker, unvaccinated, admitted February 28, 1874, with semi-confluent smallpox. Convalescence. On the 25th day sudden accession of dropsy, with scanty albuminous urine containing blood. Average quantity of urine in the 24 hours, 20 ounces; sp. gr., 1025-1026; albumen $\frac{1}{2}$ - $\frac{3}{4}$; epithelial, hyaline, and granular casts, with much renal debris and abundant blood corpuscles. Pericarditis and pleurisy; death.

Sectio.—3 ounces of serous fluid in the pericardium and visceral and parietal layers coated with recent lymph; serous fluid in both pleuræ, and lungs much congested; recent lymph on posterior aspect of right lung. *Kidneys* weigh together 15 ounces; capsule easily detached; superficial veins much congested; cortex hypertrophied and irregularly congested; kidney tissue very firm. *Microscopic examination*.—Epithelium swollen, turbid, and granular, in many places detached from the walls of the tubules; many tubes plugged with granular debris; in some parts remarkable proliferation of the nuclei of the epithelium; stroma increased in limited areas.

(7.) J. T., aged 18, labourer, vaccinated, admitted January 30, 1874, with discrete smallpox. Convalescence. About the 26th day, dropsy with blood-coloured albuminous urine, containing epithelial and blood casts, with much renal epithelium. Improvement under treatment. For next 16 days, average quantity of urine in the 24 hours, 60 ounces; sp. gr., 1015-1028; albumen $\frac{1}{3}$ rd to a trace. Dismissed, March 17, the dropsy quite gone, but a slight cloud of albumen and casts still present.

(8.) J. M'K., aged 21, labourer, well vaccinated, admitted Feby. 12, 1874, with semi-confluent smallpox. Convalescence. On the 26th day, sudden swelling of the feet, legs, and face, preceded by severe pain in the lumbar region, and accompanied by scanty albuminous urine containing blood; sp. gr., 1022; abundant epithelial casts, with renal epithelium and blood corpuscles. The urine had been examined only 2 days before, and found quite free from albumen.

Improvement under diuretic treatment, the urine increasing in quantity, and the density diminishing. Dismissed, April 3, the dropsy quite disappeared, the albumen only a trace, but casts, hyaline and epithelial, still persistent.

(9.) G. C., aged 21, labourer, well vaccinated, admitted March, 16, 1874, with semi-confluent smallpox. Convalescence. On the 29th day, sudden œdema with porter-coloured urine, containing epithelial and blood casts with much granular matter; sp. gr., 1020; albumen $\frac{1}{4}$ th. Improvement under treatment by wet packs, urine becoming abundant; sp. gr., 1010 to 1012; diminution in the quantity of blood, but albumen and casts still present. Dismissed, April 23, at his own urgent request, the dropsy having almost disappeared.

(10.) E. A., aged 14, plumber, well vaccinated, admitted March 28, 1874, with semi-confluent smallpox. Convalescence. On the 18th day, dropsy with scanty albuminous urine containing blood; sp. gr., 1015; albumen $\frac{1}{4}$; epithelial and blood casts, and much debris. Uræmic convulsions. Gradual improvement under the wet pack and diuretics. For the last 26 days of his residence in hospital, the average quantity of urine in the 24 hours was 66 ounces; sp. gr., 1013-1020; albumen $\frac{1}{2}$ - $\frac{1}{4}$; casts persisted in large numbers, the epithelium showing a tendency to fatty degeneration. Dismissed, May 25, 1874, the dropsy quite gone, but albuminuria still present.

(11.) S. M., aged 21, labourer, well vaccinated, admitted March 23, 1874, with discrete smallpox. Convalescence. On the 18th day, the urine became very bloody, followed in 2 days by anasarca; chocolate sediment; sp. gr., 1020; albumen, $\frac{1}{3}$; blood and epithelial casts with much free blood, and a quantity of loose epithelium. Urine scanty for first week, average quantity in 24 hours 30 ounces, and always contained much blood. Uræmic convulsions. Improvement under purgation and diuretics. For next 46 days, average quantity of urine in 24 hours 60 ounces; sp. gr., 1010-1024; albumen varied in quantity, but always persisted; epithelial, granular, and hyaline casts

with much debris; occasionally triple phosphates. Dismissed improved, May 15, 1874, with a slight degree of dropsy still present.

(12.) J. E., aged 24, engineer, badly vaccinated, admitted April 3, 1874, with confluent smallpox. Convalescence. On the 30th day, dropsy with albuminous urine containing epithelial casts; sp. gr., 1022; case under observation only 6 days. The urine during that time abundant; sp. gr., 1014-1020; casts and albumen always present. Dismissed, May 8th, as his ship was to sail next day. Seen a month later, and the albuminuria still persisted.

(13.) H. M'K., aged 14, schoolboy, unvaccinated, admitted May 22, 1874, with semi-confluent smallpox. Convalescence. On the 23rd day dropsy, with scanty albuminous urine, containing much blood; sp. gr., 1014; epithelial and blood casts and much debris, with abundant free blood corpuscles. Urine rather scanty for first week; uræmic convulsions. Gradual improvement. Average quantity of urine for next fortnight was 60 ounces in the 24 hours; sp. gr., 1016-1020; albumen and casts diminished, but persistent. Temperatures showed only a slight febricula for the first two days of the attack. Dismissed improved, July 4, 1874.

(14.) D. F., aged 19, engineer, well vaccinated, admitted June 4, 1874, with discrete smallpox. Convalescence. On the 26th day sudden œdema of the legs and feet, with scanty albuminous urine. For the first 10 days average quantity of urine in the 24 hours, 23 ounces; sp. gr., 1016-1018; albumen $\frac{1}{2}$ - $\frac{2}{3}$; abundant epithelial and granular casts, much renal epithelium and a few blood corpuscles. Gradual increase of urine, and subsidence of dropsy during the last 4 weeks of his stay in hospital; average quantity in 24 hours 63 ounces. On first increase, sp. gr. fell to 1013, but soon rose, and on the date of dismissal 1019 was recorded; albumen one-third to one-sixth; casts diminished, but still very abundant, chiefly granular and epithelial, and the large

quantity of loose renal epithelium was always a marked feature in the case. Temperatures showed a slight febrile movement at the commencement of the attack 99·8, but it soon fell within normal limits. Dismissed improved, July 27, 1874.

(15.) P. L., aged 13, potter, unvaccinated, admitted June 4, 1874, with semi-confluent petechial smallpox. Convalescence. On the 27th day sudden general œdema, with scanty albuminous urine; sp. gr., 1030; albumen, one-sixth; epithelial and granular casts with much free renal epithelium, but no unequivocal blood corpuscles. Increase in urine under diuretics; disappearance of dropsy and fall of sp. gr. to 1012-1013; albumen and casts persistent. Temperatures normal. Dismissed improved, July 7, 1874. Specimen of urine obtained three weeks later; sp. gr. 1013; albumen considerable; granular casts.

(16.) D. B., aged 17, said to be vaccinated, but no mark seen, admitted May 28, 1874; confluent eruption. Desiccation and convalescence. On the 28th day scanty albuminous urine containing blood. The urine had been examined four days previous, and found quite free from albumen. Severe dropsy; urine very scanty for some time (10 to 19 ounces in the 24 hours); sp. gr. high; albumen $\frac{1}{2}$; great quantities of casts, chiefly epithelial, and much blood. Case under observation for two months; the albuminuria persisting during the whole time, and on his dismissal (August 9) although the urine was very abundant (105 ounces in the 24 hours), the precipitate of albumen was still large, and many granular casts were present. The dropsy never quite disappeared, and he presented the waxy pallor in a marked degree.

II.—AMPUTATION THROUGH JOINTS WITHOUT INTERFERING.
WITH THE PROXIMAL BONE, AND
REMARKS ON THE DRESSING OF STUMPS.

By GEORGE H. B. MACLEOD, M.D., F.R.S.E., *Regius Professor of Surgery,
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Infirmary of Glasgow.*

AMPUTATION through joints has long been a recognised method of operation, and the object of the following communication is to advocate a modification of the usual practice, viz., to leave, in every case in which it can be done, the proximal bone with its incrusting cartilage untouched in the stump.

It is doubtless well known that for a long time a very great prejudice existed against amputation at joints, founded chiefly on the recognised danger which attends "wounds" of articulations. The fear was great of exposing cartilage and fibrous tissue to the air, or interfering in any way with these structures. Tetanus, diffuse suppuration, phlebitis, and purulent poisoning were said especially to attack such cases, and thus, amputation in the continuity of the limb was performed in preference to that in the contiguity or at a joint. Even in those instances in which the saw was not applied, the ancients appear to have used the actual cautery to destroy the cartilages rather than leave them exposed in the wound. In more recent times again, the opinion has prevailed that proper adhesion would not take place between a surface covered with cartilage and the soft parts laid over it; that the suppuration would be rendered far more profuse by the presence of the cartilage, which it was thought must exfoliate before the stump could heal. Those among us, however, who have had much operative experience, and whose attention has been directed to the fact, must have seen many cases in which the incrusting cartilage of a bone has behaved in no such injurious way, but, on the contrary, has given no trouble whatever.

The writer's attention was first forcibly drawn to the action of healthy cartilage in stumps when serving as surgeon to the General Hospital in camp before Sebastopol,

and he has referred to the fact in his work on the surgery of the war. In several cases of amputation through the larger joints he did not touch the cartilage, and the results were such as very strongly to show him not only that the fear which many had expressed regarding the consequences was unfounded, but also with the indubitable advantages attained. In civil practice these observations have been extended and confirmed. Of course, the instances in which the practice alluded to can be pursued are not very numerous, *i.e.*, the cases in which it can be fairly carried out bear a comparatively small proportion to those in which it is not applicable, yet, in the public practice of a large city, it is by no means uncommon for injuries (by railway and other wheels and by machinery), so completely to destroy the distal bone as to demand its removal, and yet to leave the end of the proximal bone unhurt. It is perhaps at the knee that we most often have to deal with this state of affairs. The chief difficulty then is to obtain sufficient covering, but by sacrificing no tissue, and not allowing ourselves to be restricted to the usual classical methods of amputating, we frequently succeed almost against hope.

To constitute a good "method" of amputating the chief requirements evidently are—thoroughly to remove what is destroyed or diseased; to retain as much of the body as possible, *i.e.*, to keep as far as we can from the trunk, and so diminish the risk of the operation; to obtain sufficient covering, and that of a kind which will form a good stump (muscle to cover bone, and skin to cover muscle); to fashion our flaps so that they will readily fall into and retain their place; to provide good drainage; and to place the blood-vessels and nerves, and also the cicatrix, out of the way of pressure. If to this we add that, other things being equal, we should as far as possible aid the mechanist in securing a good point of attachment for a false limb, all those conditions will have been enumerated which influence the surgeon in deciding on any special plan of operating. The decided preference manifested in our day for long

anterior and short posterior flaps (mainly promoted by Sedillot, Baudans, Lisfranc, Teale, and Spence), is the best evidence of how strongly these views have attracted the attention of the profession. Such methods of amputating allow us to elevate the end of stumps without harm, and, in some cases, this is an important consideration. Now, in amputating through any of the joints we are able in a great degree accurately to fulfil the requirements to which allusion has been made. At the shoulder, Lisfranc's method of cutting a postero-external large flap does so very completely. At the hip the ordinary large anterior flap falls down like a cap over the joint. Cardens and Teales at the knee give perfect results. Syme again reverses the relationship of the long and short flaps at the ankle to attain very obvious and good ends, but here, too, we now restrict very greatly the size of the heel flap, so as to diminish the hollow which it otherwise forms, and, by keeping the angles free, we are able to secure the most complete drainage. Baudans' amputation, in which the long flap is taken from the front of the instep (and would thus in some respects more perfectly fulfil the conditions laid down), provides such bad tissue for covering the stump that it must be rejected. At the elbow, Dupuytren's plan of securing a long flap from the back of the joint and cutting the tissues short in front, is more in keeping with modern practice than the reverse method which is occasionally adopted. At the wrist, the writer strongly advocates Dubruils' device of using the coverings of the thumb for a flap, as nothing could be more satisfactory than the results it has afforded him. In amputating fingers and toes at their phalangeal joints, the dorsal long flap carries out the system advocated, while the oval plan is so perfect, when employed at the higher articulations, as to leave nothing to be desired.

Now, in a considerable proportion of traumatic amputations, and in a larger number of operations for disease at joints, than, theoretically, one would be apt to suppose, the articular end of the proximal bone can be left wholly uninterfered with, as its cartilage is sound and will live and pro-

teet the bone. Of course this is not a question which has any bearing on those cases in which amputation can be performed below a joint (though, if the choice lay between operating through the head of the distal bone, and through the joint immediately above, the writer would unhesitatingly remove the limb at the joint, with the reservation of not touching the proximal bone, believing, as he does, that the risk is much less), but the main question he wishes to allude to is that in those cases in which we have the choice of amputating through the joint, or in the bone close *above it*, it is best to choose the former.

By employing such cap-like flaps, as have been referred to above, and in no way interfering with the cartilage or bone, the writer is satisfied that better results *in every way* will be obtained, than by following the almost universal habit of sawing off the articulating surface, or at all events paring off the cartilage. Of course it is only in cases where the incrusting cartilage appears to be altogether sound that such a practice as is here advocated would be thought of.

The objections which can be urged to the proceedings alluded to are—

1st. The risk of the bone below the cartilage being diseased, though the cartilage itself appears sound.

2nd. The difficulty of getting covering for so large a surface as the expanded end of the proximal bone usually is.

3rd. The alleged slowness of cicatrisation, and the difficulty of obtaining adhesion between the flaps and the cartilage.

4th. The supposed increased suppuration; and

5th. The injurious influence which is said to attend the leaving of shreds of synovial membrane within the flaps.

Now, with regard to these so called objections, the writer would observe, that by careful attention we can always judge whether the bone is sound, and, if it is diseased, we should do better to remove the cartilage alone, and gouge away any affected portion of bone rather than saw off an entire section as is generally done. Of course, if the

disease is too extensive for this, then the case is not one to which the plan here described is at all applicable.

As to the coverings, they are too often condemned, simply because they are thickened and apparently changed to the eye, and the operator removes them, having failed to observe how often these structures resume their healthy character whenever the source of irritation has been taken away. In many cases we must take care to sacrifice nothing, and to endeavour to retain as much breadth of flap as possible, and to provide amply for the retraction of such muscles as are known greatly to shorten after they are cut. As regards delayed cicatrisation, failure to adhere, necessary exfoliation of the cartilage, increased suppuration, and the injurious influence of shreds of synovial tissue in the wound, the writer has had ample experience to prove to him their utter groundlessness as objections to the proceeding he has described. In fact, bones covered with sound cartilage cause vastly less irritation, and consequently less suppuration than sawn bones; and it is extremely rare for any portion of the cartilage which has been covered up by a flap to die or be thrown off. If any detrites of synovial membrane, which appears to be diseased, is seen between the flaps, it can easily be removed at the time of the operation.

The advantages which attend amputation in the continuity and non-interference with the proximal bone, may be thus shortly stated:—

Exarticulation is quicker, easier, requires simpler instruments, and is attended with far less bleeding (from our having to deal, as a rule, with the main arterial trunk), than amputation in the continuity. By not touching the cartilage we can keep further from the trunk, have a longer stump, and not expose the very vascular and, hence, very absorbent end of the long proximal bone.

There are here very great and important benefits which need not be enlarged upon. The risks of septicæmia and ostio-myelitis are reduced to the lowest attainable point as the bone (the chief agent of absorption in stumps) remains sealed. Operations thus performed are attended

with much less shock—the integuments preserved are, as a rule, those best fitted for withstanding pressure—there is vastly less risk of injury to the flaps and blood-vessels and nerves by the action of the unsawn bone acting on them, and hence we need not fear protrusion or pain subsequently—we are less apt to be troubled by the retraction of the muscles, as their close adhesion to the bone down to its end is not weakened—the power of sustaining the pressure of apparatus is much earlier acquired, and the point of support is broader and better fitted for pressure than when the bone has been divided. If to this we add that the anastomosis of the blood-vessels in such flaps is very quickly established from the large supply of twigs on the level with joints—that we have no bleeding from the bone to deal with or dread, and that a false limb can with perfect success be fitted so as to retain the joint motion with a stump of the natural length, all the leading advantages of the mode of operating dealt with will have been stated, and it must be allowed that such advantages are neither few nor inconsiderable.

Of course, we cannot amputate through a joint the seat of malignant disease; but it is in secondary amputations for accident that the most marked good is obtained, and it is in such cases that the great dangers of septicæmia and ostio-myelitis are apt to arise.

It may be further added that the redundant size of the articulating head of the bone, which is in some cases left in the stump, in time disappears, and it becomes beautifully rounded and well adapted for the end of a stump.

It is the writer's wish to append a very few remarks on the dressing of stumps, as for years he has clinically tried nearly all the various ways described by our leading surgeons. The best results have always been got from the simplest plans, always supposing care had been taken in the formation of the flaps. A few deeply placed and firmly fixed metallic sutures should be used to fix the flaps and keep them from moving about; "sutures of reserve" may be inserted with advantage at the time of the operation to

bring together other portions of the coverings afterwards, when the suppuration has ceased; but, in the first instance, the most complete and perfect drainage is of so much consequence that almost everything should be made subordinate to it. Lay the stump on some soft absorbing material, of which the writer thinks teased oakum is about the best, and so place it that the discharge will get freely away. No splint should, as a rule, be applied, and, if possible, the end of the stump should be slightly depressed during the period of suppuration. A piece of lint wetted in a weak solution of some antiseptic may be laid loosely over the end, but this is not requisite, as where the air in which the patient lies is tolerably pure, stumps do as well uncovered. For three days the first dressing should be left, and afterwards only such changes made as will insure the most perfect cleanliness, *which is essential*. Great gentleness in dressing. No scrubbing, but the free use of a current of water from a kettle or a syringe; the adjustment of the loose sutures as required, and their support, if need be, by stripes of adhesive plaster as the wound consolidates and the stump requires moulding, and then, too, careful bandaging to secure a good shape, comprises all the necessary directions the writer's experience has shown him to be required in the great run of amputations.

III.—CASES OF FOREIGN BODY ACCIDENTALLY SWALLOWED, WITH REMARKS ON TREATMENT IN SUCH CASES.

By JOHN BRUNTON, M.A., M.D., *Counsellor of the Medical Society of London, &c.*

ON the 22nd January last one of my children, aged four years, got possession of one of the leaden seals used for fastening the wires which hold down corks,—the Bordeaux patent fastening. The seal is in diameter about the size of a farthing—three times as thick—rough on the surface, and with a piece projecting from the rim, out of which pass the wires. On this occasion portions of twisted wire projected one-third of an inch, so that the seal resembled a locket,

as there was some guilt on it, and the child sporting with it, put it into her mouth for safe carriage. Going up stairs, she helped herself by catching the rail, accidentally slipped her foot, and, stumbling, swallowed the "locket." The nurse's attention was attracted to her, by her complaining of pain in her throat. Nurse did not think the seal had actually been swallowed, so I was not informed of the occurrence till three hours after. On inquiry I found that my child had had a hearty supper of bread and milk before going to bed, and evinced no uneasiness. At eight o'clock I woke her, and, on inquiry, found that the doubt which existed on the matter was removed for certainty, and also that no pain was complained of.

Considering the weight of the seal, about $\frac{3}{4}$ oz., its irregular surface and projecting piece with protruding wire ends, as well as the age of the child, I felt great anxiety on the matter.

What was to be done? Four hours had now elapsed, and a hearty supper had been taken, the probability was that the seal had passed out of the stomach, if its weight would allow of it. An emetic was useless; independently of the danger that if the foreign body could be ejected from the stomach it might become lodged in a more dangerous place. Also, an emetic probably would act upon the bowels and produce a result not to be desired.

Consulting with my partner, Dr Ashburton Thompson, we agreed that the best treatment was to avoid purgatives, and to give food of such character as would produce abundant fæces. So next morning a good breakfast of oatmeal porridge was had, cake during the day, and egg hard cooked. At dinner, meat and plenty of vegetables, with dried fruit, and bread and milk for supper. The child made but one complaint of pain during the day, and that at dinner. I thought from the expression of her face that she was suffering pain in her bowels. About six o'clock she had two actions of the bowels, and evacuated the leaden seal in a third, exactly twenty-six hours after it had been swallowed. A relief to the child and to ourselves.

The seal was unaltered in appearance, having been too short a time in the intestinal canal for much, if any, chemical change to occur.

Unfortunately I did not see the motion, as it had been put away while I was out, but from the description given it contained undigested food, fæces, and some mucus.

The seal possibly acted as an irritant, because there was increased action of the bowels and rapid evacuation with mucus.

There are many events which, in the ordinary course of one's daily practice, pass by as common or comparatively uninteresting. But when they come home to one's own door, so to speak, they are taken notice of, and lead to further observation and elucidation.

The case which I have narrated occurred at home, and from the nature of the body swallowed, gave rise to anticipations of a serious character. I have often had cases of children swallowing coins, thimbles, marbles, and such like round and smooth bodies, which were passed through the intestinal canal without much trouble to the patient and concern to myself; but the body swallowed on this occasion, from its weight and projecting irritating wires, as well as chemical properties, caused me some uneasiness.

The satisfactory result of treatment induced me to look into some of our standard and every-day works on medicine, surgery, and diseases of children, to see what was said on the subject. But I was very much surprised to find that except in two surgical works only—and these both most extensive—little or nothing was said on the subject. Works on medicine and diseases of children are silent.

In Chelius' *System*, p. 388 vol. ii., a very interesting article, with a narration of extraordinary cases exists, and in Holmes' *System of Surgery*, vol. ii., p. 466, there is also an article on the subject, in which the line of treatment I adopted of my own accord is advocated.

It seemed to me as if this subject belonged to the debatable ground—neither medical nor surgical, on account of the silence on the matter

Irritation of the alimentary canal, produced by indigestible food, parasites, special poisons, and the like, is looked upon as purely medical—is an indigestible coin or other body purely surgical or medical? One would be inclined to look upon it as medical, so long as it did not produce symptoms calling for surgical aid, such as abscess, impaction in the rectum, and so forth, and yet medical writings are silent, and so are most of the surgical.

However, the case stands as it is, and on this account I have been induced to narrate the above, and comment upon it.

Now the question is one of treatment, and what is best to be done?

We know the danger of heavy bodies becoming lodged in the ileocolic region, where they may produce inflammation, abscess, and in most cases death. When large bodies are swallowed they do not often get out of the stomach, and nearly always death ensues, but when ordinary sized bodies get into the stomach they usually pass out of it after a time, and may pass through the intestinal tract with safety. The common plan of treatment is to give a purgative, such as castor oil, to facilitate the removal of the foreign body. Here I join issue with the practice, and look upon it as theoretically and practically erroneous. Given such a case as narrated, it is clear that a purgative will carry off the fæces by thinning them, and (in most cases) the fæces will pass and leave the body behind. I know of one case where a halfpenny was swallowed by a child in August, and castor oil was administered freely, with such result; the coin was left behind, lodged somewhere, and was discharged on the following Christmas-day.

The plan I adopted was to give such food as would produce copious fæces, so that these might envelope the body and cover up its irritating points, that, being incorporated with the fæces, it might produce as little irritation as possible, and pass out naturally. Certainly, in the case narrated, some irritation followed, but probably it was due more to the irritant character of the fæces than to the

foreign body. Chelius says (*loc. cit.*), "bulky bodies often pass without any difficulty through the whole intestinal canal; *pointed* bodies are easily retained, and produce frequently inflammation and ulceration." (p. 390.) "In order to protect the stomach and intestinal canal against the effect of any such body, mucilaginous ensheathing food," and here I join issue, "and especially antiphlogistic treatment and *purgatives* to hasten the passage of the foreign body must be employed."

Ensheathing food and natural motion—*no purgation*, to my way of thinking—is the correct treatment.

The London "smasher" when detected in the act of passing his false coin almost invariably swallows it if he can, and so does the thief. He does not treat himself to purgatives, but encourages costiveness by eating hard boiled eggs, cheese, bread and milk, and other such diet. By and by the bowels act, the coin is carried through, and little or no harm ensues.

Some time ago I had another case, where a little boy, about the same age, swallowed a screw nail nearly an inch and a half long. Treatment on the same principle was adopted, and the nail passed per rectum, enveloped in *fæces*, in about 36 hours.

I have related these cases and set forth the treatment, which I think correct, because "the treatment of a case in which a foreign body has become lodged in the alimentary canal, gastric or intestinal, must be ever a subject of extreme anxiety." (*Holmes', loc. cit.*)

IV.—NOTES OF TWO CASES OF IDIOPATHIC PHLEBITIS.

By JOHN AIKMAN, M.D., *Guernsey.*

PHLEBITIS of idiopathic origin is, fortunately, not a prevalent disease, but it is one which makes large demands upon the tact of the practitioner. It does so, because the primary disease is insignificant as compared with the remote consequences, while it usually occurs during constitutional states in which the apprehension of danger would lay a

serious incubus upon the already depressed nervous energy. When we have but a blood clot, prone to softening, forming the barrier between life and almost certain death, the necessity for stringent restriction is imperative. On the other hand, a submission to restriction, to be effectual, must be willing; and to be willing, must appear to the patient to be reasonable. The difficulty is no insignificant one, in dealing with a public which is only too apt to attribute selfish motives to the actions of the medical practitioner.

Both the following cases have fallen under observation within the past two years; both occurred in females; and in both the function of menstruation was interested.

Case I.—A girl of 17, who had previously been under treatment for anæmia with amenorrhœa, and presented still the peculiar physiognomy of the disease. On the 13th of June, 1872, she complained of stiffness in the calf of the right leg, and swelling of the leg generally. The discomfort was not very great, indeed, the girl walked to the surgery to show herself. The veins on the inner aspect of the lower leg were large and turgid, as also those of the ankle and dorsum of the foot. In the upper part of the thigh, in the situation of the long saphena vein, there could distinctly be felt a hard cord about $2\frac{1}{2}$ inches in length, and tender to pressure—though not exquisitely so. The lower leg and foot were swelled, but not œdematous. The *bruit de diable* was distinct at the base of the neck, but this feature had been nearly constant for the previous six months. The menstruation was very scanty, often amounting to merely a show of colourless fluid. Beyond the frequent necessity of going up and down stairs, and occasional work at a sewing machine, no cause could be assigned to the disease.

I rubbed the skin overlying the inflamed part with solid nitrate of silver, and enjoined strict rest, with nutritious diet, and a small supply of stimulant. At the same time, she took a mixture consisting of strychnine, quinine, and phosphoric acid.

Next day I found that the caustic had blistered freely, and the superficial tenderness obscured deeper examination.

A week later this superficial tenderness had passed off, and the indurated cord, though clearly perceptible, was not tender to such pressure as I ventured to apply to it. I now encased the limb lightly in a flannel bandage, still insisting upon the recumbent position.

All went well, (the patient being kept under pretty close supervision), until the 6th of July, when a violent rigor occurred. The temperature, which had never previously much exceeded the normal, ran up to 102.4° F., and the pulse to 130. I became alarmed, and suspended the pernitrate of iron, upon which I had placed her two days previously.

On July 7th, pain in the left side of the chest was complained of, and, upon examination, I found there a pleuritic rub of small extent. The temperature had fallen to 101.4° , and the pulse to 116. She was then put upon opium.

On July 8th, the temperature and pulse maintained their pitch, but upon July 9th had returned to the normal standard, and I again had recourse to quinine. The little pleurisy passed off without the occurrence of effusion, and all went well until July 17th, when swelling of the left leg occurred, with unmistakable evidence of phlebitis in the left saphena close to the opening in the fascia lata. This was treated in a similar manner to its predecessor, and went on uninterruptedly to recovery. As the local symptoms diminished, I gradually increased the tightness of the bandages, and finally reduced the legs to nearly their normal size. The girl wore the bandages for six months or more, but having accepted a situation as nurserymaid, somewhat neglected their use, and the swelling returned. So far as I could ascertain there was no return of the disease.

I saw her recently, and ascertained that still the legs swell after any unusual exertion. When she feels out of health she has recourse to a prescription for an iron and strychnine mixture, and so far has avoided any serious inconvenience.

Case II.—Occurred in a lady, 44 years of age, in whom the first signs of climacteric had begun to show themselves.

Her menstrual history was peculiar, in so far that she did not menstruate until the age of 20, and that there had been several periods of intermission.

On the 5th of January, 1874, I was called to see the patient for a general complaint of "out of health," but could discover no definite disease. Her only localised discomfort was a feeling of stiffness in the right arm; and, she thought, some swelling. This swelling was not perceptible, but the hand felt full, as though it had been hanging out of bed, and the rings on the fingers were tight. There was a soft blowing murmur at the base of the heart, inconstant in its rhythm, and evidently not organic. For six months the general symptoms had been perceptible, the local ones more recently.

On the 8th of January, at my second visit, I found the hand and arm enormously swelled. The swelling commenced abruptly in the middle of the upper arm, and extended to the tips of the fingers. The skin was very tender, and did not pit upon such severe pressure as gave rise to acute pain.

Upon examination, I detected a small, rather elongated, lump upon the arm surface of the axilla. This lump was tender to pressure, and in the position of the veins which accompany the brachial artery. The pulse in the right radial was perceptible but obscured by the swelling. Having some doubt as to the nature of the swelling, I contented myself with the prescription of tonics and the injunction of strict rest. On January 12th, I found the swelling somewhat lessened, as evinced by its pitting, and the axillary lump stationary. Interpreting the lessened swelling by the establishment of a collateral circulation, and the stationary condition of the lump, by the supposition that it was due in part to blood clot, and not wholly to inflammatory induration, I ventured freely to apply the nitrate of silver. As in the former case, it blistered.

From this date the œdema of the arm slowly subsided, but upon January 20th, there appeared, at the bend of the elbow, tenderness, a hard cord, and a superficial tape-like

redness. To this I at once applied nitrate of silver, and to the whole arm a bandage, lightly. By February 3rd, the tenderness had so far disappeared that I began to tighten my bandages, and administered iron and strychnine.

On February 17th, the swelling had so far gone down that I was able to compare the two pulses; that of the right side was both smaller and later than the left. Ten days later the arms were nearly equal in size.

On the 4th of March the patient left her bed for the first time, and by the middle of April was well, save for the occasional swelling of the hand after exertion.

I attended this patient in August for a different complaint, and upon inquiring then, was told that even at that date the hand swelled after fatigue. A small lump was still perceptible in the axilla.

I may mention that my first suspicion in this case was pressure from a small cancerous tumour; in this I, happily, was wrong.

These cases are particularly interesting. I have hinted at their connection with disturbed menstruation, and would now desire to express my belief that their association was simply the result of their occurrence in females. I believe that any cause producing a similar state of health in males, would lead to a similar result. In other words, that the state of health, and not the cause of that state, was the necessary factor in the causation of the disease. Both cases illustrate well the benefit which accrues to treating the constitutional rather than the local symptoms in such cases as present a grave constitutional state.

V.—ON A CASE OF HERPES ZOSTER TREATED WITH ZINC PHOSPHIDE.

By J. ASHBURTON THOMPSON, *Fellow of the Obstetrical Society of London; Surgeon at King's Cross to the Great Northern Railway Company; Surgeon Accoucheur to the Royal Maternity Charity, &c.*

A. B., a youth, aged eighteen, was under treatment for an indolent ulcer of the right shin, the result of an injury inflicted some weeks previously. He was thin and pale,

suffered loss of appetite in addition to other symptoms of general debility, and appeared to have been originally endowed with a feeble constitution. He pursued a sedentary occupation. He had been treated for some time with an iron mixture, when, on one occasion of consultation, he complained of severe pain in the right chest wall, which had begun forty-eight hours before; and, on examination, some patches of herpes were discovered. They were four or five in number, of which that furthest back, situated on a level with the tenth dorsal vertebra, showed some vesicles already containing a milky fluid. The remainder were transparent. The most anterior patch was incipient; a few vesicles were discoverable, but they were quite small. The rash coincided with a line exactly transverse to the axial line of the body. A severe pain was complained of, and was described in terms usually applied to nerve-pain. To take, in addition to the tonic already prescribed, one-third of a grain of zinc-phosphide every three hours.

On the third day of disease, or about the end of the twenty-fourth hour of treatment, it was observed that many of the vesicles in the older patches were shrivelled, while one or two were actually dry; the anterior or youngest patch had aborted, and there was nothing to be seen in the situation it had occupied but some redness, and the remains of those vesicles which were in course of development on the previous day. The pain was now so much lessened as to be inconsiderable.

On the fourth day of disease, the treatment having been pursued during forty-eight hours only, all pain had gone, and the progress of the eruption had ceased. In a few days more nothing was left but a little redness of skin over the older patches and some roughness. It is not unusual to see herpes zoster abort in a somewhat similar manner to that just described. But the process is observed only in persons who are strong and otherwise healthy; nor is it completed until about the sixth day. The termination of this case is therefore not to be ascribed to a natural process of resolution.

I have elsewhere treated of the power possessed by phosphorus over certain forms of neuralgia. In those cases in which the nerve pain has a special relation to debility, this drug effects a cure with a certainty and rapidity which approximate its action to that of a specific remedy. This is most true when the debility is attended by marked anæmia, whether that be the result of hæmorrhage, or the less direct result of other causes. In the case under consideration these conditions of anæmia and nerve pain were coincident; and notwithstanding that the occurrence of an eruption in this disease points to some modification of the ordinary conditions of nerve pain, which do not involve any lesion of the skin, yet the latter was successfully treated by that drug which I have found most effectual in simple asthenic neuralgia. This result ceases to be remarkable when it is remembered that although intercostal neuralgia very frequently accompanies herpes zoster, it is not an essential of the disease. Considerable difference of opinion exists as to the percentage of cases in which the pain and the eruption concur. The cutaneous nerves may, nevertheless, have a direct connection with the production of this rash; and that being so, it becomes plain that two conditions of nerve may exist in the same disease, of which one is not invariably present. As for the other symptom; *herpes*, it is true, cannot be recognised but by the eruption; but, to generalise a little more widely, is it not probable that the symptom which lends a name to the disease, is also a symptom merely—an accident liable to attend upon many neuralgias, which are known by this descriptive term alone? Some support is offered to an answer in the affirmative by the case related; for, not only was the pain at once and speedily removed by the remedy appropriate to it, but simultaneously the *eruption* aborted; that is to say, that the symptom which observation has shown to be accidental was removed; that the symptom which warrants the appellation of *herpes* was removed too; that the latter, therefore, is also an accidental symptom, and that cure was effected by the specific action of phosphorus upon an unascertained condition of the cutaneous

nerves. On this view the disease called herpes is a nerve disorder, sometimes evidenced by pain alone (neuralgia), sometimes by a rash only (herpes), and sometimes by the two together. To complete the investigation which is suggested by these remarks, it will be necessary first to confirm the above observations in a number of similar cases, and then to observe the effect of phosphorus on herpes uncomplicated by pain.

The remedial powers of phosphorus over other kinds of cutaneous disorder has been favourably reported upon by Cazenave and by Dr Hughes Bennett. Reasoning from the analogous position which phosphorus and arsenic hold in chemical classification, Dr Broadbent was led to employ it in various affections of the skin, and his experience offered many remarkable examples of its efficacy. These results have been corroborated by the independent observations of Dr Eames of Dublin. Mr Erasmus Wilson, writing in 1868 upon the subject, anticipated that phosphorus would be found useful in such diseases as depend upon deranged nutrition of the skin, and in some of those which are called congestive.

Many facts may be called in evidence of the special power of this drug to affect the capillary circulation of the skin, and, probably more directly through the cutaneous nerves, its nutrition. The result, in these respects, of the medicinal employment of phosphorus in a small or tonic dose, is seen first in an elevation of the temperature of a half or three-fourths of a degree; this, if the ingenious suggestion made by Dr C. B. Rayne* be correct, viz., that the temperature of the body depends in part upon resistance offered to the passage of the blood through the vessels, would seem to point to a contraction of the capillaries. If the dose employed be a large, stimulant dose, these vessels become expanded; and in consequence, should this effect be maintained for any length of time, the temperature falls as much as three or four degrees. But if the use of the small dose first referred to be persisted in, the result is seen

* Dr C. B. Rayne, *The Lancet*, Vol. II., 1874, p. 466.

in a fuller state and more regular beat of the pulse, which, in certain cases of dementia,* has been found to give with the sphygmograph a deeper and less tremulous downstroke than it yielded before treatment. Practical observation showed Von Löbel that the continued use of phosphorus is sometimes attended by itching and irritation of the skin, which may almost always be seen to become moist, and sometimes to perspire copiously; and Weickard has recorded two or more cases of poisoning with the metalloid, in which one symptom was the occurrence of gangrenous or phagedænic spots upon the surface of the body. Lastly, among the earliest uses to which phosphorus was put in medicine, was its administration in a large (or stimulant) dose to promote the eruption in the exanthematous fevers, when it was delayed, deficient, or had retrograded. Here, then, is evidence that phosphorus acts upon the capillary circulation; by causing a contraction of the vessels in a small dose, or by causing dilatation of them in a large dose; or lastly, by improving the tone of the general circulation (and presumptively of this part of it, too) when it is administered in a small dose during a sufficiently long period. This is one manner in which phosphorus may modify the condition of the skin; there is yet another.

A more direct connection exists between the state of the nerve-trunks and skin eruptions than is generally taken into account; and phosphorus has special powers over this part of the nervous system. Eruptions not distinguishable from the diseases psoriasis and eczema have been known to occur on the surface of limbs of which the main nerve trunk had sustained injury from accident or disease, and to be confined to that situation; and further than this, to have disappeared upon the removal of the local nerve disease. It is over the nerve trunks, and more particularly when they are superficial, that phosphorus exerts special powers. This is exemplified in cases of acute neuralgia, occurring in persons who are otherwise in good health. A person employed in exposed situations sustains a continued application

* Dr W. E. Ford, *American Journal of Insanity*, January, 1874.

of cold and damp air to the side of the face, and is shortly attacked by neuralgic pain in the trifacial nerve. Such a case as this will yield with rapidity and certainty to a few stimulant doses of phosphorus. The cause of the attack is local—the attack confines itself to a definite situation, and the remedy removes the condition in too short a time to allow of any modification of the general state of the patient. Although this seems to point to a specific action of the remedy upon the *nerve* affected, it seems to me extremely probable that the morbid condition involved is in fact some interference with the blood supply to it. This, I think, is in a measure supported by the analogy which may be observed between the action of croton oil in this disorder and that of the drug under consideration. No more ready remedy for such an attack of acute trifacial neuralgia as that referred to is known than this drastic purgative; but no specific powers are, so far as I am aware, accredited to it. It is therefore possible that it acts in virtue of its power as a drastic to disturb the balance of the circulation, and in this way may restore that to the affected nerve, of which it has been deprived by the paralysing effect of cold, and which is essential to its healthy action. Notwithstanding this, however, a distinction may be drawn between this action of phosphorus, apparently most directly exerted upon the state of the capillary circulation of the nerve trunk itself, and the power which it possesses of modifying the general capillary circulation of the surface.

Bearing in mind these four modes of operation on the skin, that is, by expanding its capillary vessels, by contracting them or giving tone to them, by operating on it more directly through the cutaneous nerves themselves, or lastly, by remedying a general state of anutrition, it becomes plain that remedial effects may be anticipated of this drug in a variety of skin disorders. Thus, for example, in the first manner it may be used with marked effect in promoting the rash of measles, scarlet fever, typhus, and other eruptive fevers; in the second it may be expected to operate favourably upon psoriasis, which is one of the congestive skin dis-

eases; in the third, as it was observed to act in the case above described, in arresting the normal course of *herpes zoster*; and, lastly, it may be expected to afford signally successful results in those eruptions which depend upon a general condition of mal-nutrition and anæmia.

Practically, phosphorus has been found by Drs Broadbent and Eames to be possessed of powers over chronic skin diseases, which are superior to those of arsenic in the rapidity with which they are evinced. Psoriasis, eczema, acne indurata, lepra, lupus, and scrofulo-derma have all of them, and that in more than one or two instances only, yielded to this drug with marvellous rapidity, notwithstanding that in some cases the affection was of old standing. In the face of the probabilities above indicated, and of the facts last referred to (which are well known) it is not quite clear for what reasons its employment has not been more generally adopted. Probably the difficulty of administering free phosphorus has hitherto contributed a sufficient obstacle; a word therefore upon the form best adapted to the present purpose will not be out of place.

It will be observed that the case of *herpes* was treated and was treated successfully, with the phosphide of zinc. The decomposition of this drug within the body affords the effects of free phosphorus; in my opinion, ten parts of zinc phosphide are equivalent in therapeutic effect to one part of the uncombined element. The other phosphides and hypophosphites are not ascertained to afford the effects of free phosphorus. This compound, which, given in a dose of one-third of a grain repeated every two or three hours, is, generally speaking, sufficient to remedy such an attack of neuralgia as accompanied the rash in this case, and was therefore employed in it, is not that which appears to me best adapted for the treatment of other forms of skin disease. Many of these attend upon states in which advantage may be gained from the use of cod liver oil; and, at the same time, that a solution of solid phosphorus in oil is that form which best ensures the absorption of the drug in its free and most active state, this fish oil is that one

which alone does not expose the element to changes which are either destructive of its remedial powers; or render it dangerous to the patient. These, therefore, are two reasons for employing in such cases a solution of the drug in cod-oil; a third may be found in the fact that such a solution possesses neither the smell nor the taste of the element. Still, patients are found who will not or cannot take the solvent; under these circumstances, no more elegant or effective means of exhibiting phosphorus exists than a concentrated form of the same solution enclosed in little gelatine envelopes forming what are known as "*perles*."* These, it need scarcely be said, are quite tasteless; and if taken immediately after meals, cause little or no phosphoric eructation.

The dose of phosphorus which may be given with advantage will vary strictly with the object in view. In the example before us, acting on my knowledge of the treatment most desirable in acute neuralgia, it was attempted at once to induce the stimulant action of the drug, by giving full doses of the zinc-phosphide; and this result being obtained, the disease was cured. So, in the eruptive fevers, it is the stimulant effect of the drug which it is desired to produce, and it must be attempted in the same manner—by exhibiting full doses from the beginning of treatment. As a rule, for this purpose I should be inclined to prefer phosphorus in an alcoholic or etherial solution, given in a dose equal to one-twelfth of a grain, and repeated every four hours. But where the object in view is to give tone to the cutaneous vessels, or to improve the general nutrition of the body, a much smaller dose of the element should be employed, and its administration must be continued for long periods. In these cases, if the patient can be persuaded to swallow a large dose of cod liver oil, he may be allowed to take the thirtieth part of a grain of phosphorus, dissolved in from two to four drachms of it,

* Such capsules have been prepared for me by Messrs Young & Postans, London, containing various doses of the element. I have found them eminently satisfactory.

thrice daily. If, however, this amount of the solvent be objected to, or be deemed unnecessary, the "perles" may be employed. These can be obtained containing the dose named in about four and a-half minims of oil; but, if these preparations be employed, I prefer to administer the same dose in a larger number of capsules (containing a more dilute solution), since, by this means, much unpleasant eructation may be avoided, to which the more concentrated solution does give rise, notwithstanding every precaution.

In this way free phosphorus may be administered for long periods with perfect safety, provided the quantity employed does not exceed one-fourth of a grain *per diem*—an amount which, probably, it will seldom be necessary to employ in the treatment of skin diseases. Nor, except under special circumstances, will it be found necessary to seek any other method of exhibition.

Thus, although it is possible that with further knowledge of the effects and mode of action of phosphorus in cutaneous disorders, some other more advantageous mode of employing it may be devised, for the present, at all events, I consider that this one fulfils all the necessary conditions of safety and physiological activity. It is in these matters that the pharmaceutical preparation of phosphorus has, until quite recently, failed; and since any imperfection in the preparation employed leads on the one hand to the serious risk of the patient, or, on the other, to disappointment in the result of treatment, probably a knowledge of this method of exhibition will lead to a further and more systematic inquiry into the value of phosphorus as a remedy in chronic skin disorders. The result of treatment with the remedies at present at command is scarcely so satisfactory as to render such an investigation superfluous, while the result of observations hitherto made has, so far as they are reported, been remarkably successful. From a consideration of these notes and some knowledge of the physiological action of the drug, I scarcely doubt that phosphorus will acquire a just reputation in the treatment of

chronic skin diseases not inferior to that at present enjoyed by arsenic.

VI.—OCCASIONAL REPORTS ON LOCAL OUTBREAKS OF EPIDEMIC DISEASE.

By JAMES B. RUSSELL, M.D., *Medical Officer of Health, Glasgow.*

THESE reports were drawn up in the ordinary course of official duty, for the information primarily of the Committee of Health. They are therefore simple, being intended for the information of laymen. To extend the circle of their influence, they have, in whole or in part, been published in the current newspapers by order of the Committee. I now insert them in the pages of this *Journal* partly to preserve them as repositories of facts, and partly in the hope that they may aid my professional brethren, who are medical officers of health to their private patients, in their investigations into the causation of preventable disease.

I.—Report on the Prevalence of Fever in Myrtle, Cedar, and Westbury Streets, and its supposed connection with a collection of water in neighbouring quarry, (26th Dec. 1872).

Enteric or gastric fever and also scarlet fever have been unusually prevalent in Myrtle, Cedar, and Westbury Streets, and a general impression prevails among the inhabitants of those streets, which has found expression in a newspaper correspondence, that the cause is a collection of water in a neighbouring quarry.

As your Sanitary Inspector, Mr Macleod, has explained, this quarry has been the subject of correspondence and inquiry for some time. The proprietor assured Mr Macleod that the water was not stagnant; that it arose from a spring which had to be kept down by pumping during the working of the quarry; that now its overflow ran constantly into the sewer in Cedar Street, and that it contained fish. All these statements we have verified. Minnows are abundant in the water, and the following is Mr Tatlock's "Report of

an analysis of sample of water taken from quarry (unused) in Cedar Street, 20th December, 1872,"—

"The sample as received for analysis was clear and colourless, perfectly free from any offensive smell, and quite pleasant to the taste. A careful analysis gave—

			Grs. per gall.
Mineral matter,	...	...	20·3
Organic matter,	...	...	4·9

"The organic matter was found to be practically all of a vegetable character, and only ·32 of the 4·9 was oxidizable. This is a smaller proportion even than is found in Loch Katrine water. Only a trace of nitrates could be detected.

"In these circumstances I am of opinion that this water could not prove a cause of offence or injury to persons residing in the immediate neighbourhood of even a large body of it."

I am quite satisfied that the quarry has nothing to do with the acknowledged prevalence of disease in this locality; I am also satisfied that there are conditions within many of the tenements predisposing to the more intense local prevalence of such a disease as enteric fever at seasons when it is found scattered over the community generally. A street is composed of individual lands or tenements, which often have peculiarities of construction, rendering them in a sanitary aspect as distinct as if they were miles apart in local position. Such is the case in the streets referred to. They are made up of properties erected at long intervals, and entirely dissimilar in their internal arrangements. Therefore, while to say that fever has prevailed in Myrtle, Cedar, and Westbury Streets is quite true, it is also true that fever has been much more prevalent in some properties in those streets than in others; that, in fact, in some properties *no* cases have occurred so far as we know, and that this unequal distribution of disease coincides remarkably with obvious differences in the efficiency of the sanitary arrangements of these properties.

In the autumn of 1871, enteric fever appeared in a family living at an odd number in Myrtle Street, and in another

living in Cedar Street. There was no epidemic prevalence of this fever in that year, as there certainly is this autumn. But those cases indicated the sanitarily weak points of that locality. The odd numbers of Myrtle Street represent properties exactly similar, and it is there that nearly all the fever of Myrtle Street this autumn has occurred. The houses are small; every house contains a water-closet placed either next the main-door or in some other part of the small lobby, and with no ventilation of the closet, except into this lobby, and none of the lobby except into the apartments. The soil pipes were ventilated after the cases occurred in 1871, at the instance of Mr Macleod; but complaints of smells pervading the houses are common still. Out of 42 families so situated, we are aware of 14 cases of enteric fever, and 16 of scarlet fever, since 1st September; while, on the opposite side of the same street there are 22 families, only 12 of whom have water-closets in their houses, the rest being supplied by 5 conveniences on the stair, all of which are properly ventilated, and there were in the same time only 2 cases of enteric fever, and 4 of scarlet fever.

A similar contrast is afforded by Westbury Street. On one side of that street there are 31 families having 31 water-closets inside their houses, which are ventilated by shafts, but in two closets the soil-pipe was found to ventilate into the shaft, instead of by an independent pipe carried clear out into the open air. The result of course was to establish a path for sewer gas into all the houses. On that side of the street there have been since 1st September 7 cases of enteric fever and 2 of scarlet fever. On the opposite side of the street there are 28 families, only 11 of whom have water-closets in the house, the remainder being served by conveniences on the stair, and without the defects of ventilation existing across the street; and *we are not aware of any cases of fever having occurred among them.*

Another striking illustration is afforded by a stair in Cedar Street, containing 16 families, 14 of whom have private water-closets, which are ventilated by three shafts, but *into all these shafts the soil pipes ventilate their gases.* It

was here the isolated case of enteric fever occurred in 1871. It reappeared last July, and at intervals since, cases have occurred in four different families, all on the same stair.

Of course these defects are all remediable, and their removal is being effected by Mr Macleod as quickly as possible. I must say that even where no such monstrous blunder has been made, as the ventilating of soil pipes into a shaft whose atmosphere is common to that of all the dwelling-houses on a stair, I look with suspicion on the shafts themselves, regarded simply as ventilators of the air of the water-closets. They create a risk, indeed a certainty, of a host of mishaps in the way of conveyance of effluvia from house to house. Tobacco smoked in a water-closet ventilated into such a shaft will be felt in a few minutes in the other water-closets. I am quite satisfied that these shafts are weak points in the sanitary constitution of the tenements in which they exist, and that periodically those tenements will be affected by unusual prevalence of such diseases as enteric fever, diphtheria, &c. Long intervals may pass without obvious ill health, but when epidemic influences affect a district, those weak points are certain to be discovered, as has now been the case in the streets referred to in this report.

II.—Memorandum on a Group of Cases of Typhus Fever, (22nd Nov. 1873).

I BEG to submit the following memorandum containing the history of a group of cases of typhus for the information of the Committee of Health, not because of the novelty or rarity of the facts, but because they afford a singularly clear illustration of the lineal propagation of a contagious disease, obtained at a time when it is not epidemic amongst us. When such a disease becomes epidemic, the propagating seed is sown broadcast, and the family history of the cases becomes confused and inextricable. It is only in seasons like the present that such a history as the following can be made out, but the very same laws govern the spread of the most virulent epidemics of typhus, and consequently, now,

while the seed is scanty and before it multiplies with each successive crop, like the grain of corn in the story of Robinson Crusoe, is the time when epidemic ought to be preventable with ease.

I. On the 6th April last a girl was removed from the Lock Hospital to Belvidere suffering from well-marked typhus. On inquiry we found that she had been removed from a house in Piccadilly Street. We shall call this girl and her family A. They lived in a house of one apartment, which was filthily dirty; and having mentioned the institution through which the girl passed to our hands, it is unnecessary to say much of their morals. A brother was found at home ill of typhus, and removed. On 4th May two sisters were removed. This was four cases of typhus in all from the family of the A.'s.

II. On the 5th May a girl M'G., living on the opposite side of Piccadilly Street, was removed to hospital. She was a companion of the A. family and frequently in their house. M'G. had a clean house, but had been before the magistrates for overcrowding, and was admonished.

III. On 27th May a young man from a third number in Piccadilly Street was removed to hospital. He was a frequent visitor on the family of the A.'s.

These are the two primary offshoots from the A. family. Meanwhile the M'G.'s removed from Piccadilly Street to Stobcross Street, and

IV. On 1st June another daughter was removed to hospital. This ended the career of typhus in this family, but from this point it branched off through various families on the stair.

V. On 4th July a girl M'D., who lived on the landing above, was removed. The house consisted of two small apartments, tolerably clean, but overcrowded, the family being a large one. There have been five cases removed from time to time from this family.

VI. The M'D.'s were extremely intimate with the family of the C.'s, who lived on the same landing, and on 19th September a girl of eight years was removed from their

house. Subsequently the mother, a son, and another daughter have been removed. There seems to have been a mutual process of infection between the M.D.'s and the C.'s. The disease was present in the M.D.'s in July and August. It was present in the C.'s in September when it had left the M.D.'s. In October it was in both families, and the last case occurred among the M.D.'s on 12th Nov.

These are the two secondary offshoots from the A. family. The following are two tertiary offshoots :—

VII. On 7th October an unmarried sister of Mrs C.'s, who was present in the house when her sister was removed, took typhus in Grove Street, in the Northern District.

VIII. On 7th November a brother-in-law of M.D.'s, living at the same number was removed. This man has a large family, and we may have more cases yet from it.

Here, for the present, this genealogy ends. There were several other families in Piccadilly and Cheapside Streets where cases of typhus occurred, which we suspect are traceable to the A.'s, but I have only introduced those mentioned regarding which we have no doubt.

The details of a similar illustration of the propagation of typhus, which occurred in the northern district, are before me, but I shall not dwell upon it. In that instance the disease began in three overcrowded houses in Church Place. Thence it was conveyed to Lyon Street by a family who flitted from Church Place, and there it passed to another family living across the lobby. From Church Place it was also conveyed to a family in Garscube Road, and to another in Brown Street. We can up to this date reckon sixteen cases belonging to this group.

I think important lessons may be derived from these facts. Exactly in proportion as I have succeeded in proving that the first series of cases of typhus was propagated from the family of the A.'s, I have also proved two things—

1st. That all those cases were preventable. This is as plain as that if we destroy the dandelion flower, we prevent the seed which will soon mature from floating hither and thither through the air.

2nd. But I have also proved that we failed to prevent it, and it is therefore of the highest importance to know how we failed.

In all these instances every case was removed to hospital, and all the seeds in and about the patient's body were destroyed; the bedding and body clothing not being actually worn, the house and the air in it were all purified, and the seeds lodged therein destroyed. But in every case there were first, the bodies of those left behind in apparent health; and second, the personal clothing in actual use covering those bodies; both of which contained seeds which were not destroyed.

Had we been able to take those members of the family away from the locality to the Reception House, the seeds within their bodies would have fructified under medical observation, and on the first signs of activity the now sick person would have been sent to hospital; the personal clothing also would have been exchanged for clean clothing, and so the seeds therein would have been destroyed.

I am convinced that had we been able to persuade the A. family to submit to such a regime, this genealogical tree would have been much stunted in its growth.

I may now add to the above the remark, that there can be no doubt of the possibility of the transportation of the seeds of infectious disease in the *clothing* of *healthy* persons. Such an event must be rare, if not impossible, in the intercourse of cleanly people living in comfortable houses (excepting in the case of scarlet fever and smallpox, especially the latter); but the poor, especially the Irish, in our large cities, so generally sleep in the clothes, or the principal articles of the clothes they wear by day, so crowd together, and are so uncleanly in their habits, that in their daily contact with the public they are magazines of infectious disease, if such exists at home. Their foul odour is perceptible on the open street, even on a breezy day. A case is known to me of a well-known cab proprietor, who died of typhus

fever caught from an ill-doing clerk, who lived in a house of one apartment. He slept in the one family bed, partially clothed in his working suit, during his wife's illness with typhus, and was himself seized *at the same time as his master*, who had been in close contact with him, supervising his book-keeping.

This is one of the many instances in which the information of a central department in a large community solves the mystery attaching to the pedigree of individual cases of infectious disease. Many cases of what appear to the private practitioner to be instances of partheno-genesis of contagious disease are thus proved to be branches of a genealogical upas tree. We are thus compelled to respect the sickness of the poorest member of a community on the narrow ground of self-interest. Carlyle puts the case in his own incisive way in this passage of "Past and Present :"—

"One of Dr Alison's Scotch facts struck us much. A poor Irish Widow, her husband having died in one of the Lanes of Edinburgh, went forth with her three children, bare of all resource, to solicit help from the Charitable Establishments of that City. At this Charitable Establishment and then at that she was refused; referred from one to the other, helped by none;—till she had exhausted them all; till her strength and heart failed her: she sank down in typhus-fever; died, and infected her Lane with fever, so that 'seventeen other persons' died of fever there in consequence. The humane Physician asks thereupon, with a heart too full for speaking, would it not have been *economy* to help this poor Widow? She took typhus-fever, and killed seventeen of you!—Very curious. The forlorn Irish Widow applies to her fellow-creatures, as if saying, 'Behold I am sinking, bare of help: ye must help me! I am your sister, bone of your bone; one God made us: ye must help me!' They answer, 'No, impossible; thou art no sister of ours.' But she proves her sisterhood; her typhus-fever kills *them*: they actually were her brothers, though denying it! Had human creature ever to go lower for a proof?"

VII.—ON THE GUAIAECUM TEST IN HÆMATURIA.

By D. FOULIS, M.B.

THE following remarks are intended to convey very briefly the results of the trial of the guaiacum test, as proposed by Mahomed,* in the urine-room of Dr Gairdner's wards. The urines tested have been of very varied character, and have been subjected to careful examination by the other methods in use. The number of observations was 260. It was found that the guaiacum and ozone test enabled us to detect minute quantities of blood in the urine. It appeared, however, that there were, in certain urines, pigments which were so closely allied to hæmatin that they produced with the test in question, reactions which though at times clearly distinct from that of blood, yet at other times closely simulated it. Some of these urines were shown to contain bile; others were from patients whose urinary system was to all appearance quite healthy. Thus, in one case of facial paralysis, an apparently normal urine gave the following reaction:—When the ozonic ether was dropped on the slip of blotting paper, the part not tinged by the guaiacum assumed a fine mauve colour; the part covered by the guaiacum became green, apparently from the combination of the yellow guaiacum stain with the mauve. This reaction was observed in other cases. Some urines, again, developed a greenish hue with the test, much resembling the fainter blood tints. The blue reaction, when blood was present in any appreciable amount, was indeed very distinctive. But in those cases where the amount of blood was extremely small, and where the guaiacum test might have been expected to supersede the microscopic test, the blue tint became modified, and, to a certain extent, obscured by the yellow colour of the guaiacum, so that a confirmation of the test became, in such cases, imperative. This was fur-

* The method, as proposed by Mahomed, and followed out by us, is the following: Dip a slip of blotting paper into the urine; when it has dried, drop a few drops of tincture of guaiacum; this dry, add a drop or two of ozonic ether. When this dries the presence of hæmatin is shown by the production of a blue colour, which is more distinctly seen if the slip of paper is held up to the light.

nished by the careful search for blood corpuscles after allowing the urine to settle.

The conclusion come to, therefore, as to the clinical value of the test under discussion was, that, subject to confirmation by other tests, it formed a useful addition to the means of detecting blood in urine. Where there are a number of urines daily to be examined, a good plan is to dip the slips and hang them up to dry. In the evening, any one, a nurse for instance, can add the guaiacum; and by next morning the papers are ready for the ozonic ether. The same process can, of course, be gone through more quickly with the aid of a spirit lamp to dry the slips. Attention may thus be drawn to the state of any particular urine, and it may thus become the subject of more strict examination. It may be taken as a rule, however, that the guaiacum test *alone* is not sufficient to decide as to the presence of blood in the urine.

VIII.—REPORT ON A CASE OF TETANUS TREATED WITH CALABAR BEAN.

By JAMES M'EWAN, M.B., *Port-Glasgow.*

THOMAS M'M., aged 10 years, a strong, robust boy, was seized on Sunday, September 13, with stiffness of jaws and soreness of throat, which deepened into general tetanic spasm towards the evening of the next day, when I was called in. On enquiry, was shown a wound on the dorsum of right foot, the history of which was elicited only indirectly a few days later, and was as follows:—Had been playing about some planks of wood, some of which falling upon him had caused the wound. Afterwards the foot swelled up, but under the influence of cold water dressings the swelling had subsided. When seen, the wound appeared to be cicatrizing healthily; there was no surrounding redness, no swelling, and no pain complained of. The accident had occurred three weeks before.

Present Condition.—Face flushed, and bearing a suffering expression. Skin warm and moist. Pulse 120. Bowels constipated. The spasms are by no means severe. They

take the form of opisthotonus, with this peculiarity, that the muscles of the right side (that upon which the wound is) contract so much more strongly than those on the left, that the patient is forced round upon his left side, while at the same time bent backwards. Spasms of this intensity recur at intervals of twenty minutes. But, short of this, a spasmodic interruption to respiration, evidently due to contraction of the diaphragm, is of frequent occurrence. Teeth can be separated half an inch. No difficulty of deglutition. To have Tr. Conii, 20 minims, and Tr. Belladonnæ 15 minims given at first every four hours, afterwards every two hours.

September 17th.—No remission of symptoms; pupils much dilated from the action of Belladonna. General condition much as noted above, except that the spasms are more frequent. Bowels have been opened by injection and a purgative.

Icebags applied along the spine without influencing the spasms. Similarly, a continuous current from twenty cells (sulphate of copper) is without the least effect, whether applied along the spine, along the phrenic, or to the contracted muscles; the annoying pricking sensation complained of at the point of contact of the pole, is the only evidence of its action upon the patient.

A procedure which exerts a considerable influence over the convulsions, is the regular and forcible effort at inspiration. Many of the milder spasms are averted by this substitution of a voluntary for an involuntary contraction of the muscles.

On the evening of this day, the Calabar bean is commenced in doses of one-eighth of a grain of extract, its effects being carefully watched with a view to its being pushed. The dose is repeated every half hour. The indications of its action looked to are, the effect upon the spasms, upon the pulse, upon the pupil.

18th.—The dose of bean has been gradually increased, by additions of one-eighth grain at a time. At present he is taking one and a half grains of extract every half hour. No

effect has been produced upon the pupils or pulse; but the spasms are certainly influenced greatly. For, although an interval of half an hour is still rare, yet the spasms are of so little intensity for hours together as to amount to a marked remission of their severity. Teeth can be separated to the extent of an inch. Nourishment is taken freely. Sensibility entirely unaffected, as it remained until the end.

19th.—Up till this morning there was nothing either in the history of its causation, or the appearance of the wound to indicate its being the seat of persistent irritation. At that time the patient complained of his foot, and seemed ill at ease with it. When examined, a slight swelling was noticed, from which when pressed a drop of creamy pus exuded. An incision was instantly made into the swelling, and a quantity of pus escaped, but owing to the supervention of a severe spasm whenever the foot was touched, no examination of the condition of the wound could be made. During the day the physostigma was pushed, until the maximum dose, $2\frac{1}{2}$ grains of extract, was given at 3 o'clock p.m. Beyond this point it was not considered safe to push it, its physiological action being strikingly manifest. The pupils were contracted to pin points. The pulse from 120 had come down steadily during the night, until it reached 70. It had also become irregular. Independently of the action of the bean, as a part of the general disease, it had been noticed that the pulse suddenly ran up to 140 or so previous to the accession of a spasm, continued high during the spasm, and came down after the spasm had passed away as suddenly as it had gone up. But now, independently of the spasm, and when the patient was at perfect rest, within any single minute, the pulse might be counted at 60 for the first quarter, to 80 or 90 for the next. It remained firm, could be counted easily, and never lost a beat.

Notwithstanding the so decided action of the Calabar bean upon the pupils and pulse, the spasms became more severe in the afternoon of this day; they seemed to be less influenced than they had been formerly by the exhibition of the drug, which was accordingly stopped.

Upon consultation with Dr J. W. Taylor, Port-Glasgow, it was determined to place the patient under chloroform, search the wound for an excentric cause of irritation, and, in case none should be found, to divide the nerve leading to the part. Accordingly, at 5 p.m., under chloroform, a splinter of wood 1 inch long by $\frac{1}{2}$ inch broad was extracted from the interosseous space betwixt the first and second metatarsals, about an inch from their heads, where, in a position perpendicular to their axis, it extended deeply into the tissues of the sole. I have never seen a patient take chloroform more easily than did this boy. A whiff, a powerful but not long continued spasm, and he was over. After the chloroform, patient slept quietly for half an hour, when the spasms commenced anew, and soon became more severe than they had ever been before. At 9 p.m., again under chloroform, the external popliteal nerve where it passes over the head of the fibula was divided. This procedure had been delayed until the result of the extraction of the splinter could be noted. At the best it was but a forlorn hope, but was justified by the recorded success which has attended similar operations. But it proved useless in its effect upon the spasms, which recurred as before after the influence of the chloroform had passed away.

It was now deemed possible that the continuance of the spasms might be the result in some measure of habit, so to speak, of the nerve centres, which habit might be broken by the induction of sleep. Fifteen grains of chloral with five of bromide of ammonium was given and repeated within an hour, with the result of sending the patient into a sound sleep. But the spasms were not thus prevented, for every half hour, sometimes oftener, a severe convulsion would ensue, which would barely awaken the patient, who was asleep again ere his muscles had relaxed.

20th.—At 3 a.m., the convulsions being very severe, one grain of physostigma extract with fifteen grains of chloral was administered. No bean had been given for twelve hours past; the pulse had gone up to 100 and was regular; the pupils had again dilated. Within an hour thereafter

the spasms were markedly abated, an effect which became more decided as the morning advanced ; indeed, at 10 a.m., it was noted that there had been no severe convulsion for several hours. The pupils were again contracted. During the day the dose was augmented to $1\frac{1}{2}$ grains extract, which, however, was no longer given at intervals of half an hour as formerly. Chloral hydrate in 15 grains doses was also given, the patient being kept very much under its influence. Nourishment taken in large quantity, pulse continued to go up until it reached 120.

21st.—Chloral and physostigma continued as yesterday. Patient very quiet. Spasms now very unfrequent and of little severity. Pulse continues at 120. Pupils contracted.

5 p.m., Patient complained of cold, without apparent cause. No shivering, sensation momentary, but followed by profuse perspiration having the odour of sweet hay. The pulse ran up to 160, at which rate it continued during rest of day.

22nd.—Pulse had come down in the early morning to 108, but is again up to 160. Pupils contracted, spasms continue to abate. Dose of physostigma has been diminished to one grain, and the interval betwixt doses still further lengthened. Chloral was continued until 9 o'clock this evening. At that time, after a dose of 15 grains given with a dose of bean, the patient was found with suffused face, profoundly narcotised. From this condition he was with difficulty aroused, but the chloral was stopped. There was no recurrence of the cold sensation.

23rd.—Pulse continues at 160 ; weaker than it was yesterday. Pupils still contracted. Spasms are practically confined to hand. Takes less nourishment to-day, but is being freely stimulated with ammonia and wine.

Dose of bean has been steadily reduced to $\frac{1}{2}$ grain of extract, repeated at intervals of three or four hours.

On the whole the patient is decidedly weaker. Mucus in the throat has commenced to be annoying.

Mucous râle communicated from the larger bronchi is heard over front of chest, where also the percussion note

is clear. Behind there is decided dulness over lower part of left lung, as compared with right. Over whole back, especially on left side, moist crepitus is easily detected. Heart dulness normal. First heart sound is inaudible. Impulse distinct and defined. Dulness of liver and spleen normal in extent.

24th.—Patient died this morning. Very early the pulse went up to 180, and became weak and fluttering. Difficulty of deglutition became marked and for this reason, and since the case seemed now beyond hope, the bean was discontinued. After two or three hours the spasms returned, and becoming more and more severe, attained at length before death a severity which had not been previously witnessed. Intelligence remained unclouded almost until the last.

Post mortem examination, revealed the following condition of internal organs.

Lungs congested, especially upon the posterior aspect, and the lower lobe of left lung; crepitant throughout; when cut into much bloody fluid escapes. In the fissure at upper part of lower lobe of left lung two small nodules of condensation, one the size of a bean, the other rather larger, were cut into; they had a triangular form, and were evidently the result of emboli. No metastatic abscesses were found. Recent and limited adhesions of pleural surfaces found upon right side. Heart normal in size, flaccid; ventricles contained a little fluid blood. Pericardial fluid normal in quantity and unchanged. Liver, spleen, and kidneys, especially the latter, deeply congested, but otherwise unchanged. Brain and spinal cord not examined. Condition of *wounds* indicated considerable reparative change.

Remarks.—A few remarks upon the remedies employed in the treatment of the above case of “traumatic tetanus” may be deemed not inappropriate.

As has been related, the immediately exciting cause of the tetanus, was the presence of a splinter of wood in the tissues of the foot. Obviously the primary indication for

treatment was the removal of this splinter. But, be it remembered, there was nothing either in the history of the case, or the appearance of the wound itself to indicate its presence, and with the aspect of a superficial, small, and healthily healing sore, it would, I think, have been unjustifiable to lay open the foot to the extent subsequently found necessary in order to the discovery of the splinter.

With regard to the division of the nerve, the merits of the operation are not to be inferred from the fact of its ill success in this case. For it might pertinently be argued that the operation had been too long delayed. The portion of the dorsum pedes, at which the wound was situated, is supplied with nervous influence from both great branches of the external popliteal; hence the site chosen for the operation.

Application of ice along the spine aggravated rather than remitted the spasms, and was productive of acute discomfort to the patient.

Neither could the continuous current, although frequently employed, alleviate symptoms.

Of the medicines tried, Belladonna and Conium, as above administered, failed to prevent the disease increasing in severity.

Chloroform and Chloral acted admirably in procuring sleep for the patient. Moreover, they doubtless prevented spasms, in so far as these were dependent upon external impressions for their causation; but over the spasms occurring in the regular course of the disease they were alike powerless. With regard to Chloral I am not without suspicion that it may have acted (given so steadily) upon the great nerve centres in a cumulative and deleterious manner.

With respect to the use of Physostigma a more favourable opinion is warranted. While the excentric source of irritation still remained in operation, it certainly exerted an influence over the tetanic spasms; but to procure this influence large doses were required and given. After the removal of the splinter, in conjunction with Chloral, the remedy practically mastered the spasms; and the fact that a gradually diminished dose still maintained the influence of the drug seems to me

evidence of an abating disease. At any time during the course of the tetanus, the temporary suspension of the drug was soon followed by relative increase in severity of spasms, and, after its withdrawal before death, they attained their greatest degree of intensity. The reduced irregular pulse noted at the time the dose of bean had attained its maximum was undoubtedly due to its action. The much reduced dose subsequently given failed to affect the pulse. Contraction of the pupil always resulted from even small repeated doses in this patient. If this effect could be taken as indication of the action of the drug, it is certainly not cumulative, as may also be inferred from the long continued use of such large doses, with so short intervals between. Pupils contracted to pin points had attained their normal appearance at the end of from four to five hours. No further action of this drug upon internal organs was noticed.

Physostigma was given as extract (P. B.), rubbed up with mucilage.

What the immediate cause of death may have been I know not. Doubtless the congested condition of lungs acted powerfully as an accessory. The phenomena attendant upon the chill noticed on the 21st, had prepared me to believe that some form of septicæmia had set in. (I omitted to note that a similar feeling of cold was complained of the night before the patient's death.) The infarcts noticed in the left lung were the only positive appearances found at the autopsy in favour of such a view.

IX.—ON A PECULIAR MODE OF DEATH IN DIABETES; ON ACETONÆMIA; ON THE TREATMENT OF DIABETES BY GLYCERINE, AND INJECTION OF DIASTASE INTO THE BLOOD.

By Professor KUSSMAUL, of Freiburg. Translated by DAVID FOULIS, M.B., and SAMSON GEMMELL, M.B.

WITHIN the last year I have seen three cases of diabetes die with remarkably similar symptoms, in which a peculiar dyspnoea, preceding and accompanying a comatose state, played the chief part. I hold myself therefore justified in regarding this as not merely accidental, but rather as a result of diabetes hitherto not observed, and intimately connected with the lesions which lie at the root of the disease. I append the three observations in the order in which they occurred.

First Observation.

A healthy woman, aged 35, in good circumstances, and the mother of several children, was under treatment for *procidencia uteri* and ulcers on the cervix. In the summer of 1869 it was remarked that her urine left white spots on her under-clothing. After the summer of 1872 the thirst which had previously existed increased. She complained of great weakness, and was easily made breathless by going up stairs. At the end of December, 1872, chemical examination of the urine revealed diabetes. On the 16th May, 1873, the patient walked for two hours continuously and returned home very tired. On the 17th and 18th she did not complain more than usual. On the night of the 18th she slept well till 2 A.M., when she awoke, suffering from great dyspnoea, pain in the hypogastrium and malaise. At 11 A.M. I found the patient tossing about in bed and crying for relief. She was pale, the limbs cold, the pulse small, compressible, quick, (135-140), the breathing loud and frequent (36), and the respiration laboured. She complained of severe constriction and pain in the hypogastrium. She stated that her menstrual period was at hand. The abdomen was flaccid and normal, but deep pressure in the hypogastrium elicited pain. The heart sounds were weak, the respiratory murmur loud and pure, the patient was quite conscious; the urine abundant, containing sugar and no albumen. The treatment consisted in warm foot and arm baths with salt and ashes (*salz und asche*), sinapisms, warm cloths to the body, and subcutaneous injection of morphia. No improvement resulted. It was quite apparent that the patient was in great danger, and that the diabetes was the cause, but the connection was not quite clear. It was at first imagined that changes had occurred in the blood and other fluids of the body, and that this had caused painful excitement of the sensory nerves of the sexual organs—organs already hyperæmic in expectation of the menstrual period—and an excitement of the nerves of the respiratory organs. Was it a physical change in the blood, or a chemical alteration, which rendered it unfit to absorb the necessary quantity of oxygen? These questions remained as yet unanswered. At all events, death was now so imminent that transfusion was resolved on. It was performed at 12.30 P.M., by Professor Czerny. When the median vein was opened by a pretty free incision, only a few drops of reddish brown blood passed and coagulated at once—60 to 90 grammes were obtained with difficulty, and on the surface of it there was a bluish white, milk-like fluid,

which under the microscope was seen to be composed of a few white blood corpuscles and a mass of granules, chiefly fat. After the injection of the first 18 grammes of blood the patient stated she was no better, but after the second 18 grammes she volunteered the statement—"I feel much better." The pain in the hypogastrium disappeared permanently. Seven times 18 grammes were injected, of which 120 may be said to have entered the circulation. The patient felt much relieved. The pulse increased (130); but there was no change in the respiration, which remained as frequent and laboured as before. At night the patient was in the same condition.

On the night of the 19th May the restlessness and dyspnoea increased, and were not relieved by repeated morphia injections. On May 20 she was very uneasy, tossed about in bed, and complained of a feeling of great constriction. There was pale lividity, respirations 36 to 40, pulse small and quick (140), all the respiratory muscles very active; head and body warmer than on previous day. After mid-day she sank into a comatose state, in which the hard laboured breathing continued. She died at 9 P.M. At the *post mortem* examination next day the lungs were found moist, and in the lower lobes there was much frothy bloody serum. On the surface of both lungs about 20 small wedge-shaped hæmorrhagic infarcts, the largest about the size of a hazel nut. The most of them were of old standing, only one or two fresh on the left lung. In the pleuræ many miliary ecchymoses. The heart flabby, the muscle yellow brown, and easily torn. In the interior of the heart a little coagulum, and some thick fluid blood. In the pericardium a little clear serum. The liver large, yellow, brown, and uniformly fatty. The spleen large, brown, red and soft. The kidneys somewhat enlarged and fatty, pale, in the cortical substance slightly yellow. In the mucous membrane of the pelvis of the kidneys a few small ecchymoses. In the pancreas small ecchymoses. In the right ovary a cyst of the size of a nut, and a *corpus luteum* the size of a pea. The mucous membrane of the uterus swollen and covered with bloody slime. The skull thick, heavy, the parietal bones especially thick. Pia mater easily detached, sulci well marked, brain substance firm, the vessels moderately full of blood. In the ventricles a few drachms of clear serum. The veins used for transfusion were pervious.

The blood was taken from the heart into a vessel, and it showed on the following day a milky layer on the top. Blood

collected from the pulmonary artery showed also a distinct white coat. From a cut in the lower lobe of the left lung we could even obtain from one vessel pure milky serum. The opacity of the serum was discharged by shaking with ether. The microscope showed in the milky layer numerous fat granules of various sizes, chiefly free, but some also enclosed in white blood corpuscles. Besides this there was a very fine detritus which had the character of albumen granules, and did not dissolve in ether.

The venesection which preceded the transfusion had shown a viscid and fatty state of the blood. The investigations after death likewise established a diminution in the whole quantity of the blood—a remarkable *lipæmia* which has often been observed in diabetes. Perhaps the *lipæmia* and fatty emboli were the cause of the numerous small hæmorrhagic lung infarcts; at least, there was no other apparent cause of embolism. In particular, there was no varicose state of the limbs, and no fatty or sclerotic degeneration of the pulmonary artery which could cause thrombosis. In no case could the painful dyspnœa have its cause in these minute infarcts, of which the greatest number were of old standing. What then was the cause? This question will be answered when the results of the other two observations can be utilized for its solution.

Second Observation.

A mill girl, aged 17, of spare habit, but healthy. Diabetes had begun about the end of the year 1871. At the beginning of February, 1872, she came to hospital with a feverish diarrhœa which soon disappeared, and she left the *klinik* remarkably anæmic, with slight red flush on the cheeks. From this time her hunger and thirst gradually increased. In August, 1872, she had an attack of vomiting and diarrhœa. In February, 1873, she again came to hospital on account of diarrhœa, and it was at this time that the enormous consumption of water by the patient attracted attention, and investigation of the urine showed diabetes mellitus. She was about the middle height, and had thin bones, weak muscles, was emaciated and pale, the cheeks however sometimes flushed. Her neck was long, her thorax small and flat. The respiratory movement good and symmetrical; mere indications of mammæ. She had never menstruated. Skin dry but sweats occasionally. Tongue dry and slightly coated. Bowels regular every second day. On March 6, patient weighed with her clothes on 86 lbs.

She was put on glycerine treatment, and the following are the results:—In the first period, from the evening of the 11th March to the morning of the 18th March, she was put on flesh diet, with 3lbs. of bread daily. For breakfast tea and cream; at 10 A.M., 2 eggs; at mid-day soup and double flesh ration with vegetables; at 3 P.M., 2 eggs; in the evening flesh and salad. The drink was $\frac{1}{2}$ litre of red wine daily freely diluted. No medication was employed. The patient exceeded the allowed quantity of food. The average amount of urine passed from 6 P.M. till 6 A.M. during these seven days was 3671 centimetres. From 6 A.M. till 6 P.M. only 2800 centimetres. The average sp. gr. of the morning urine was 1030·8; of the day urine, 1033·3. The per centage of solids in the night urine, 4·8; in the day urine, 7·6.

In the *second period*, from the evening of March 18th to morning of March 25th, the same diet was continued, with 30 grammes of pure glycerine to 1000 grammes of water and 5 grammes of citric acid. She voided daily during this period 3429 cmts. of morning urine, and 2814 cmts. of day urine. Sp. gr. of morning urine 1030·8, and of the day urine 1033·4; percentage of solids in morning urine 4·9, of day urine 7·4. The whole quantity of sugar in twenty-four hours was, in the first period 388·0 grammes; in the second period 373·3 grammes. The difference therefore was small. On March 25th the patient weighed with her clothes 89 lbs., and her appearance was fresher, and the thirst less.

In the *third period*, from the morning of March 25th to April 1st, the patient took the same diet and 50 grammes of glycerine daily. The average quantity of morning urine was 3607 cmts.; of the day urine 2533 cmts. The sp. gr. of the night urine was 1030·9, and of the day urine 1032·9. No estimation of the quantity of sugar, but it may be presumed from the above figures that there was no essential difference in its quantity. The patient continued the same diet, with an allowance of 50 grammes daily of glycerine till April 13th. The results of the analysis continued much the same. The weight of the patient on April 11th was 45,000 grammes.

In the *fourth period*, from the evening of April 14th to the morning of April 23rd, the glycerine was intermitted, and she was put rigidly on flesh diet. During this time the average quantity of the night urine fell to 2411 cmts.; the day urine to 2048 cmts. The sp. gr. of night urine was 1030·2, and of the day urine 1032·1; the percentage of sugar in the

night urine was 5.1, and on the day urine 6.6; the total quantity of sugar in twenty-four hours 258 grammes. The pure flesh diet gave much better results therefore than the use of glycerine with a preponderance of flesh in the diet; and diminished the excretion of sugar more than 100 grammes daily.

In the *last period*, from the evening of April 26th till the morning of May 3rd, pure flesh diet, with 50 grammes of glycerine daily, was ordered. Average quantity of night urine was 2668 cmts.; of day urine, 2288 cmts.; the sp. gr. of the night urine 1030, and of the day urine 1034.3; the percentage of sugar in night urine was 4.97, in day urine 7.38; the whole quantity of sugar in twenty-four hours 306 grammes. The last item had therefore increased, probably because the patient managed to procure bread now and again. The use of the glycerine had at all events not increased the good effect of the flesh diet. The patient could not endure the flesh diet any longer, and insisted on being dismissed. She returned on January 3rd 1874 in a sad condition. She was considerably emaciated, feeble, and feverish; the maximum evening temperature 38.3 to 38.5 C. She complained of constriction on movement, and remained in bed. There was found a condensation of the right apex with bronchial expiration and slight râle, slight cough, and muco-purulent sputum, great thirst, abundant saccharine urine. The quantity of urine from the 6th to the 7th January was 2560 cmts.; the sp. gr. 1030. The urine was clear straw yellow, smell resembled chloroform, thus recalling the observations of Petters on *Acetonæmia* [*Pragwirsche.*, 1857, LV., page 81]. On the 6th and 7th January patient was weary, ate little, but drank much. Suddenly on January 7th, at 9 P.M., she cried out several times, was very restless, and complained of great constriction. About 10 P.M. she was comatose, breathing loudly and strongly. On the 8th January, at 9 A.M., I found her comatose, making precisely the same respiratory movements as the first patient. The face was pale blue, the pulse small, 130, the extremities cold, the body moderately warm. At 12 noon direct transfusion from the carotid of a young sheep into the arm of the patient was performed. When the vein was opened the blood flowed slowly, was dark cherry red and thick. As soon as the arterial blood had flowed in for forty-five seconds the patient opened her eyes, and the pulse became 120, but after fifteen seconds more she began to complain, convulsive movements set in, and the transfusion was stopped. She

soon became comatose, cyanosis increased, but the breathing continued as before. She died at 2.30 P.M.

The blood obtained before the transfusion had a sp. gr. of 1060, contained fat, but less than in the first case. The inorganic constituents of the blood were .609 per cent., of which .298 was alkali.

At the *post mortem* the blood was found small in quantity and thick, the dura mater and pia mater injected; both lungs pale, in the left apex a small cavity surrounded by condensation; in the right apex a larger cavity also surrounded by condensation. The bronchial, the mesenteric, and cervical glands were swollen, both kidneys large and firm, uniformly reddish brown in the cortical and pyramidal portions. The malpighian bodies apparent to the naked eye.

In this case also there was at the last poverty and thickness of the blood as in the first case, while the fatty contents of the blood were much less in this instance, and there was no lipæmia, since a milky quality of the serum was not observed. The lungs were not intact, but the peculiar dyspnoea and the coma could not be referred to the changes in the lung. The peculiar smell of chloroform in the urine recalled to mind the so-called acetonæmia, but in the first and third cases this was not present.

Third Observation.

A waiter, aged 16, felt in December, 1873, great lassitude, thirst, loss of appetite, and emaciation. In January, 1874, he left off work, but in spite of now having a good appetite and consuming much fluid, as milk and champaign, he still continued to lose strength. He had pain in the abdomen, constipation, and was drowsy. On January 30th, sugar was discovered, and he was put on milk and a flesh diet, to which he did not adhere. On March 2nd, his exaggerated loud breathing attracted attention. Evening temperature, 37.6 C., there was a feeling of constriction, but neither heart nor lungs gave anything special beyond the loud respiratory murmur. Urine abundant, sp. gr. 1022, no albumen. On March 4, at 3 P.M., the patient complained of great constriction and pain in the abdomen, became excited and restless, throwing himself about in bed, pale, no trace of cyanosis, breathing deeply, quite conscious. The respirations, 23-24; pulse, 110, small; temperature, 38 C. At 9 P.M., he was asleep, but during sleep the dyspnoea continued in the same manner. He died at 4 P.M. on March 6.

P.M.—Ecchymoses in the stomach, some oedema of the

lower lobe of the right lung, pancreas atrophied, spleen and mesenteric glands enlarged, kidneys slightly increased, the right greyish red; pia mater above slightly oedematous and hazy, the veins injected; below it was dry and only slightly injected; the brain firm, dry, and anæmic; the quantity of blood in the body was small; the blood of the pulmonary vessels was tested as to its fatty contents, and a considerable quantity of fat obtained from it with ether.

The peculiarity in this case was the acute gastritis. Griesinger had also noticed in the body of a diabetic patient a recent catarrh of the stomach (loc. cit. page 382), and Edward Carbutt, of Manchester, found a complete gastro-enteritis (Petters, loc. cit.). In any case however this gastritis did not cause the symptoms which interest us.

Since there was no vein opened in this patient in life, the want of fluidity of the blood could not be determined with the same certainty as in the other two cases. The blood however in the corpse appeared abnormally thick and viscid. The white quantity was lessened, and the fatty contents considerable.

The lung showed no trace of old lesions. The widespread oedema and a condensed area in the left under lobe date from the last stage of the disease, and may be looked upon as results of the same process which led to the other symptoms which we are investigating.

The phenomena of the last stage of the three cases were essentially these:—

1st.—*A Peculiar Dyspnœa.*—Nothing indicated as in ordinary forms of dyspnœa that the air met with the slightest obstacle in its passage to and from the lungs; it flowed on the contrary with the greatest ease in and out: the chest expanded in all directions without any notable retraction of the lower end of the sternum or of the intercostal spaces; the vesicular murmur was loud and puerile down to the base of the lungs, and yet everything (feeling of constriction and the activity of the respiratory muscles) pointed to dyspnœa. In these cases it was noteworthy that the breathing, while exaggerated, was also quickened. The first patient breathed in the first 24 hours 36·40 in the minute: it was not observed whether the breathing became slower after coma set in. The second patient, in whose case the coma set in earlier, breathed at first 20, later on 15·16 per minute. In the third case, the breathing before the coma was 23·24, in the beginning of the coma 36, later 24·20. The breathing was also very regular, and was not subject to rapid varia-

tions. In the deeper stages of the coma in the second and third cases there was a longer pause between the expiration and inspiration. In spite of the great movement the dyspnoea never amounted to orthopnoea, on account of the weakness of patients preventing their sitting up. The contrast between the extreme weakness of the patient and the strength of the respiratory efforts was a marked feature in all the cases. The severe dyspnoea occurred suddenly in the night-time in Case I. without any special preliminary symptoms or marked aggravation in the general state of the patient on the days immediately preceding; in the second case, the patient had felt diminished appetite and constriction on movement; in the third case, an exaggerated quickened state of the breathing was noticed for several days previous, patient complained of constriction, loss of appetite, and on the last day vomited and complained of lassitude.

2nd.—*Quickened action of the heart.*—Arterial pulse, 120-140 small, weak, regular. Impulse of heart rather weak; sounds always pure.

3rd.—*Great excitement; moaning; and at the commencement even crying (in the second case); jactitation; great pain.*—The pain was seated in patients 1 and 3 in the hypogastrium; and in patient 3 also in the hips. These symptoms appeared with the dyspnoea; as the coma deepened, they diminished in intensity.

4th.—*A comatose state* which in Case II. began to develop one hour after the dyspnoea, while it appeared in the other two cases later on, perhaps in the 3rd case hastened by a subcutaneous morphia injection. I have not observed complete anæsthesia.

Death occurred with continuous dyspnoea and deep respiratory movements, and quick weakening pulse: from the beginning of the dyspnoea to the death the interval was 43, 17½, and 37 hours. The previous duration of the disease had been in Cases I. and II. several years, in the 3rd case four months.

The temperature of the body during the attack was only observed in case III. With a minimum rise at the beginning (38 C.) it sank quickly in 13 hours to 35.9 C. In both the other cases the temperature to the hand was not lowered. The urine flowed in the last stage plentifully, and continued in all three cases saccharine. In the second case at the beginning of the coma there was a paralytic ischuria; in the third case it was passed in bed during the coma. The

pupils were dilated in none of the cases; in the second case very much contracted during the coma; in the third case contracted and unequal. Finally, the paretic dilatation of the stomach deserves to be noted in the second case; although the patient had taken in the last days but little food the stomach was considerably distended with its contents.

Attention has repeatedly been called to the similarity of the symptoms in the last stages of many cases of diabetes to uræmia, and this likeness cannot surprise us, when, as not seldom occurs, the kidneys secrete, during a lengthened period, albumen with the sugar; in some cases, indeed, the sugar disappearing out of the urine, and Bright's disease setting in with marked albuminuria. However, patients suffering under glycosuria and albuminuria do not always die of dropsy or uræmia; I have lately seen a patient die of phthisis who, formerly fat, for years continually passed albumen and sugar in his urine; in the last stages of the phthisis the sugar disappeared from the urine.

The question now is, whether the terminal coma as it appeared in the above cases, is identical with uræmic coma? I think this question must be answered in the negative.

There is, it is true, a resemblance, in that the uræmic coma and the last stage of the disease in our diabetic patients, and which I will call *diabetic coma*, sometimes occur suddenly and sometimes announced by certain precursors. But here there is also a difference. One of the principal precursors of uræmic coma is headache, which was absent in our three cases. In uræmia, as in diabetes, drowsiness and dyspnoea may precede the attack, but the last has in uræmia a different character, being almost always accompanied by capillary catarrh—œdema of the lungs or symptoms of heart disease, while in the third of our cases, where there was before death constriction and deep breathing, the most careful examination of the chest revealed no trace of catarrh—œdema, or heart disease. The most important difference however, lies in the remarkable dyspnoea with the extensive movements of the chest which introduces the diabetic coma. I, at least, do not know that a dyspnoea of this sort precedes uræmic coma, and precedes the coma, as in Case I., for thirty hours. The anxiety also, the great restlessness, with the tossing of the body, the cry (Case II.) and the complaint of great pain in the hypogastrium (Case I), or in the hips (Case III.), may be named as symptoms which in the beginning of uræmic attacks are either not at all or only exceptionally

noted. Pains in the loins, not present in our cases, play an important part in uræmic attacks. The dyspnoëic breathing, however, not only precedes the diabetic coma, but lasts through it with quickened respiration as in Cases I. and III., or with normal frequency of the respiration, as in case II., and that uninterruptedly without in the three cases that stertor being heard, which is characteristic of uræmia. It may be mentioned also that in none of the three cases was the pulse diminished in rate as often occurs in uræmic coma, nor was dilatation of the pupils, which is more frequent in uræmic coma than the contraction, which in Cases I. and III. was remarked. Further, in our three cases the urine was abundant during the coma, which is seldom seen in uræmic coma; and neither before nor during the attack was there albuminuria. Lastly, the anatomical examination revealed neither the degenerative changes in the kidneys nor always œdema of the pia mater, or of the brain. In the first case alone, where the coma occurred long after the dyspnœa had set in, was there a notable œdema of the pia mater; while in the second the pia mater was not œdematous, and the brain substance only moderately moist; in the third case the brain and the pia mater at the base being even dry and only slight œdema in the convexity of the pia mater. For all these reasons it is very much to be doubted whether we had to deal in the last stages of our cases with a simple uræmic coma.

Abeille (*On Albuminous and Saccharine Urines*, 1863, p. 681) observes—"Pneumonia is a fatal disease in diabetics, which sometimes cuts them off rapidly." Griesenger's (loc. cit. p. 414) observation also supports this, and recalls our third case. We must, therefore, consider the question, whether, in our third case at least, the other two cases giving no ground for such an assumption, pneumonia had been the initial lesion. This view has several objections to it. A slight dyspnœa, having the same characters in a less degree, preceded the final urgent dyspnœa; somnolence also preceded the coma. Pneumonic patients, as a rule, breathe short and quick, and, not like our patient, deep and quick. The temperature, further, in the beginning, rose but slightly, 38 C., and sank quickly in fourteen hours to 35.9 C. Lastly, there was in the first twenty-four hours no crepitation, no bronchial breathing, and no departure from the normal percussion note, although the *post mortem* showed in the left lower lobe an extensive œdema, besides the small hepatized area, which may, therefore, have been a late

phenomenon. Besides, this area had more the character of the condensations of the lung, so often seen in soporose patients, in typhus, &c., the so-called hypostatic pneumonia. Add to these, also, the great resemblance of the last symptoms with the two other cases, in which no such pneumonia was found. It is, therefore, more probable that the small condensed area with the acute œdema was pre-mortem, and not the cause but the consequence of the dyspnœa and the coma, or else that it is to be looked upon as the co-effect of the process in the nerve centres which led to these final phenomena. I think that many cases, thought to be "*pneumonie foudroyante*," ought rather to be put in the category of our *diabetic terminal dyspnœa*.

A dyspnœa, in which the breathing is deeper and more frequent, may, as Rosenthal has shown, be due to direct excitement of the respiratory centres of the medulla oblongata—reflex excitement of the vagus will induce more frequent but weaker breathing, while reflex excitement of the laryngeal nerves must induce slow respiration.

A more difficult question is as to the cause of the excitement of the respiratory nerve centres.

Diabetes leads to poverty and loss of fluidity of the blood, which again must hinder the absorption of oxygen in the lungs. The well-known experiments of Pettenkoffer and Voit have shown that diabetic patients absorb less oxygen than in health. In our two first cases the blood flowed but slowly from the veins opened in the arm. This suggests the idea that the loss of fluidity of the blood may occasionally reach such a degree as to reduce the rate of circulation in the nerve centres to a minimum, similar to what occurs in ligature of the arteries of the neck, or obstruction to the venous return from the brain, from which would result a diminution, and finally a want of oxygen in the respiratory nerve centres. We are not justified in considering the loss of fluidity of the blood in those cases where the sp. gr., as in case II., is indeed high, but still within normal limits, as too small to cause such important disturbance in the circulation. The blood might lose in fluidity, from fatty contents for instance, and stagnate in the capillaries, without the sp. gr. being abnormal. The *lipæmia* repeatedly observed in diabetes, and which in our first case appears to have caused numerous small hæmorrhagic infarcts in the lung, is interesting in connection with this. It appears to me, however, too much to say that the final dyspnœa of the diabetic cases was simply due to viscosity of the blood,

although slighter degrees of constriction, as often occurs in diabetes, may be due to this, and to the poverty of the blood. The thickening of the blood in cholera reaches a much greater degree than in diabetes, becoming as thick as tar, even arteries when cut appearing empty, and giving issue to no blood. Nevertheless, a long-continued, regular, quickened, or at least not retarded, rate of respiration is a rare occurrence in the cold or asphyxiated stage, since I do not find it mentioned in going over the literature. The breathing remains, in many cases, quiet to the last, or appears merely quickened and weaker, so weak, indeed, that the thorax appears not to move at all. The rule is, indeed, to have great constriction, quick, irregular breathing (the author cites numerous authorities for this). In only two cases of typhoid cholera was a breathing similar to our diabetic cases seen (Leubuscher); with the development of severe head symptoms, a hard, laboured breathing moderately quick had appeared, lasting sixty hours, and not accompanied by any lung change.

If the viscosity of the blood be not the cause of the dyspnoea it is difficult to see why the oxygen did not in the free state of the lung passages reach the nerve centres. The blood corpuscles of our diabetic patients must have lost the power of taking up oxygen in the last stage. Pettenkofer and Voit ascribed the diminution of the absorption of oxygen to the inability of the blood corpuscles to appropriate it. Later, however, they doubted this. In fact the oxydation in the diabetic organism seems undiminished. The urine gives larger quantities of urea; and vegetable acids in union with alkalies, appear in it as carbonates, &c. The sugar alone appears unconsumed, which may, however, be due to disturbance in the fermentation process. I confess that in the first case, I was led to the idea of transfusion principally by remembering the hypothesis of the two Munich professors: the small good resulting does not speak favourably for that supposition. What militates most against the theory of dyspnoea being due to want of oxydation in the nerve centres is the important fact that the excitability of the nerve centres is most probably due to the presence of oxygen. It is therefore improbable that such strong respiratory movements as in our cases could last so long if there was a want of oxygen. One would suppose that breathing must have become weak and irregular. We are driven, therefore, to the supposition that the cause of the dyspnoea may lie in a chemical impurity of the blood, in the presence of something in the blood which excites the nerve centres strongly, while

the access of oxygen to the nerve centres is not diminished. We must, however, first of all consider a hypothesis based upon the diminished absorption of oxygen in diabetes, and on the strength of which Pettenkofer and Voit explain why diabetic patients die under slight exertion or slight diseases. I do not know, however, what special demands could be made on the source of oxygen in our cases, especially in case I., where the terminal symptoms appeared after several hours of good sleep. Let us turn, therefore, to the question what the blood of our diabetic patients could have contained to cause the dyspnoea. The statement might be made that the dyspnoea was not due to excess of carbonic acid. The diabetic process does not necessarily lead to an accumulation of carbonic acid in the blood since the oxydation of the sugar is stopped: besides, so long as the air passages and lungs are intact, the carbonic acid which has been shown to be excreted and doubtless also formed in much diminished quantity would be readily eliminated: lastly, several peculiarities in our cases go against this, viz., a remarkable pallor and the reddish brown colour of the blood.

The author then cites several authorities in justification, and concludes by summarising the results as follows:—

I. The dyspnoea is the result of direct central excitement, and not of reflex excitement of the vagus or laryngeal nerves.

II. It cannot be ascribed to want of oxygen in the respiratory nerve centres, caused either by stagnation of the blood in the capillaries, or by inability of the blood corpuscles to absorb oxygen.

III. It is not due to accumulation of carbonic acid in the blood.

IV. It must be due to intoxication connected with chemical disturbance in diabetes; nothing certain, however, can be given as to the nature of the toxic agent: Kaulich's *acetonæmie* does not explain it. An attempt will afterwards be made to solve the difficulty.

ON ACETONÆMIA.*

Petters was the first (1857) who demonstrated the presence of a considerable quantity of acetone in the blood and urine of diabetic patients. Kaulich confirmed the observation made by Petters, and drew a clinical picture of the state known as *acetonæmia*. The phenomena which attend the

* This part of the Paper has been much condensed.

introduction of acetone into the economy are chiefly referable to the nervous system, and more especially to the central nervous system. In small quantities it quickly produces mental lassitude, unwillingness to call the intellectual faculties into play, loss of memory, gloomy and irritable condition of the temper, and sometimes great nervousness. In larger doses, it produces a feeling of weight in the head, or dull headache, with great muscular prostration. In still larger doses it produces apathy and indifference amounting to all grades of stupefaction, then somnolence and finally intense narcosis. The pupils respond slowly to light, the respiration is slow and feeble, the heart's action weak, pulse small and frequent, the cutaneous transudation little affected, sometimes even a slight perspiration, which is suppressed, however, in complete narcosis. After further remarks, Kussmaul observes that the whole question of acetonæmia in relation to symptoms of nervous depression occurring in patients with gastric ailments requires confirmation, for—1st the chemical proof of acetone in the blood and urine of man has hitherto been furnished only in a few cases, and these cases of diabetes. It has never hitherto been found in the contents of the stomach. 2nd. Until direct experiment has shown what action acetone has on the economy and if the action is toxic in what doses it produces its effects, we are scarcely justified in drawing a clinical picture of acetonæmia. Kussmaul says that small doses are by no means poisonous, he himself having used it in phthisis in doses from 4 to 6 grains for weeks, and that without any acetonæmic effects.

Injected under the skin, acetone, in some experiments on men and animals, produced burning pain, accompanied by outcries, the effect, however, soon passing away. In the course of his experiments, the author found that the action of acetone was much less intense in the case of rabbits than chloroform or ether, appearing, however, to be stronger than that of alcohol. He found that it was quickly excreted in an unchanged form from the lungs—at least in part. He comes to the conclusion that acetone is not a real anæsthetic like ether or chloroform, although, like these, it stupefies and interferes with the voluntary movements. Its action resembles more that of alcohol, although it appears to be much more active and at the same time more transient. Acetone quickens the pulse, makes the respiration slower and deeper, and lowers the temperature.

The theory of acetonæmia, in the sense of Petters and Kaulich, is not interfered with by these experiments. The

symptoms of this state in man remain, however, to be more accurately defined. The circumstance, indeed, that it to all appearance requires a greater quantity of acetone to produce poisoning and stupefaction in man than of alcohol, excites doubt, while it is by no means certain that a substance which is so rapidly excreted through the lungs, can be formed and accumulate itself in large quantities in the system. On the other hand it seems rather plausible that a long-continued absorption of acetone into the blood may at length, especially in already weakened states of the nervous system, produce a chronic poisoning, which again may perhaps like chronic alcoholism in the "*delirium tremens potatorum*," take on an acute form.

INJECTION OF DIASTASE.

The author describes some experiments which he undertook in conjunction with Professor Claus in 1864, on the influence of the injection of diastase into the veins and subcutaneous tissue of diabetic patients, on the excretion of sugar in the urine. For details we must refer the reader to the original paper. The results, however, as formulated by the author, are :—

1st. Subcutaneous injection of 1.10th to 1.5th of a gramme of diastase dissolved in water had no palpable effect on the excretion of sugar in the urine in the case of the patient in which it was used.

2nd. Injection into the cervical veins of a diabetic patient of 1.10th of a gramme of diastase dissolved in water, diminished the excretion of sugar. The author acknowledges however, that further experiments are required.

Reviews.

I.—FRENCH MEDICO-PSYCHOLOGICAL LITERATURE. *ANNALES MEDICO-PSYCHOLOGIQUES*. From November, 1872, to January, 1874.

"*The Psychical Condition of Criminals*."—This is the title of a thoughtful paper by Dr Despine of Marseilles. The subject is one to which he has given much attention for many years, and was discussed by him in a systematic work published in 1869. After some preliminary observations on the moral powers that form the general endowment of man in

civilised countries, he endeavours to establish that these powers which in the normal man resist the perverse instincts and immoral thoughts and desires, in the criminal are either absent or feeble. This defect he holds to be frequently hereditary, and to be analogous to congenital anomalies and monstrosities in physical structure, and to deficiencies and perversions of the intellectual powers. "By the side," he says, "of men of talent, of genius, who create the sciences, who produce those marvellous works in literature and in the arts which excite our enthusiasm, we find vulgar intelligences, insensible to the creations of great minds and the splendours of nature, incapable of rising above the level of their mere personal interests and the material wants of life; we find also the feeble in intellect, the imbeciles, and the idiots. Well, these natural imperfections, these anomalies, these infirmities, these monstrosities, which we see in the order physical and in the order intellectual, exist, and are as great, as numerous, and as various in the order moral." In support of these conclusions he refers very specially to the experience and opinions of the late Dr. Bruce Thompson, surgeon to the General Prison at Perth, and particularly in regard to the influence of hereditary transmission in criminals. In this connection, also, he quotes the case of Galetto, age 20, member of a band of Italian assassins, who had recently been convicted before the court of Aix. This youth, one of the worst of the brotherhood, is grandson to one Ossalano, surnamed the Ferocious, who died on the scaffold for killing a number of young girls, and making sausages (*saucisson*) of their flesh. Galetto was called the hyæna by his fellow bandits on account of his thirst for blood. "In criminals," Dr Despine says, "there is, first, the absence or great impairment of the moral sense; second, the generous sentiments which relate to others are not less defective than the moral sense; third, the sentiments which are at the foundation of our self-interest are unquestionably wanting, or nearly so. Thus, the lack of prudence is striking, and the want of forethought is equally remarkable,—the future to them is as if it would never come. In view of ephemeral advantages, the criminal exposes himself to the severest punishments, and to the loss of his liberty. He exposes himself to be separated from his family, to be despised, to die from a violent and ignoble death which wounds human dignity profoundly! Lastly, he prefers a vagabond life, adventurous, precarious, always full of perils, to one tranquil and regular!"

In this paper, we think, Dr Despine is disposed to give too much weight to hereditary transmission as a factor in the production of criminals, and this remark is equally applicable to Dr Thompson's contributions to the subject. The experience of the latter gentleman, on which Dr Despine largely bases his conclusions, was entirely one-sided. The unfortunates who came under his observation in Perth penitentiary, whose parents were criminals, had been trained in vice from their infancy. Their intellectual and moral powers, and very often their physical being also, had been dwarfed and distorted by the degrading surroundings to which they were constantly subjected. Had these very individuals been born to a happier lot—had they grown up in a virtuous home, in a moral atmosphere of truth and honesty—how different in all probability would have been their career! How different even would have been their physical formation, and particularly their aspect of countenance, which Dr Thompson insists very often bears the stamp of the hereditary criminal. As opposed to the views of these physicians on this point, I would adduce the results of the system of boarding-out the orphans and deserted children of the poor by the parochial boards in Scotland—a system which is now being gradually adopted in England. A very large proportion of those children, in cities such as Glasgow, are unquestionably the offspring of the criminal class. Whenever the parochial boards become their guardians "*in loco parentum*," they, as a rule, remove them without delay from the evil moral influences of the poorhouse, and lodge them in the country in the houses of respectable people who are willing to receive and maintain them for a small weekly allowance. They attend the parish school, and mingle—as I can testify from personal observation—with the other children on an equal footing. They usually remain in these homes till they are old enough to earn their own livelihood, when employment is obtained for them, very often in the immediate neighbourhood. From a report published by the Parochial Board of the City Parish of Glasgow in 1872, it appears that of 883 children whose subsequent career had been followed after they had been discharged from parochial supervision, 844 were ascertained to be of good character; 39 were reported to be of bad or questionable character; but only 8 of them, 3 males and 5 females, had been convicted of crime. This I think is a very successful result, perhaps as much so as in the case of an equal number of children in at least the class of society

immediately above them, whose parentage is free from the stain of crime. It certainly shows that there is no strong innate disposition to vice and crime in such children, as might have been expected if Dr Thompson's views were correct.

Respecting the treatment of criminals, Dr Despine considers all modes of imprisonment bad and dangerous, both for society and the criminal, if they have for their end punishment only pure and simple. Moral reform, he holds, should be the chief object aimed at. And he quotes the successful results obtained in Ireland under Sir Walter Crofton, and in two French penitentiaries, where this principle was kept prominently in view.

Dr Despine shows a very laudable knowledge of the literature of his subject published in this country.

"*Note on Cysticercus of the Brain*," by Drs Bécoulet and Albert-Girand. In this paper the authors first give a short historical account of the different forms of vesicular parasites of the brain. They show that whereas formerly four varieties were admitted, more recently authorities are disposed to divide them into two distinct forms, the Echinococci and the Cysticerci, which generally affect different parts of the brain, and give rise to dissimilar symptoms. They restrict their observations to the latter class. Cysticerci, they find, are met with chiefly in the pia mater and in the superficial grey matter of the brain. The tumours which they form are usually multiple, and are seldom of large size. This is a point which distinguishes them from echinococci. Rokitsansky states that they are sometimes met with in the arachnoid cavity, but the authors consider that this must have been quite exceptional, as no other observer has found them there. In many instances, however, they have been observed in the ventricles of the brain, as in the case described in the paper.

The patient was a young man, age 28, who laboured under melancholia, which first of all was of an anxious character, with religious delusions, but afterwards merged into stupidity with general torpor of the system. It is especially noted that he never had attacks of epilepsy or paralysis. A very large ecchymosis was gradually developed in the right thigh, and after this he soon died.

At the autopsy, about fifteen cysts, about the size of a hazel-nut, and enclosing a transparent liquid, were found at different points of the upper and lateral surfaces of both

frontal lobes. Each cyst was situated between two convolutions, in the substance of which it was partially lodged. In removing the pia mater from the brain, the cysts were withdrawn from their seats, leaving depressions the shape of the tumours, formed at the expense of the grey substance, which was completely atrophied at these points. In the left lateral ventricle there was a quantity of transparent serosity, in which a small cyst about the same size as those in the convolutions was floating, free from all adhesions. It was ovoid in form, and a little white spot was observed at its smaller end, corresponding to a depression of its envelope at that point.

The cysts found at the surface of the brain had the following structure:—1st, An external envelope continuous with the inner membranes of the brain, and apparently formed at their expense:—2nd, A transparent vesicle of ovoid form, presenting near the small extremity a white spot prolonged into the interior. To the touch this white spot gave the sensation of a solid body. On microscopical examination, the coats of the vesicle were found to have a granular aspect. At the white spot there was the head of the cysticercus, characterized by its crown of hooks and four stomata.

In their observations on the case, the authors especially direct attention to the complete absence of convulsions, and to the fact of the parasite in the ventricle being free, without organic attachment to the choroid plexus as in most published cases.

The symptoms, both bodily and mental, of this disease are rather uncertain, as, though in some cases, and probably the majority, epileptiform convulsions were present, others are on record where none existed; and in the brain of one man several parasites were found at the autopsy, though during life no cerebral symptoms had been manifested at all.

“*On General Paralysis by Extension.*”—This is the title of a very interesting and valuable contribution to the literature of the never-failing subject of general paralysis by Dr. A. Feovill. This gentleman adds his testimony in support of what is now well established, that in the early stage of the disease, the condition is one of ataxy rather than paresis or paralysis. He further claims that the earlier French writers on the subject fully recognized this fact, though they did not apply the name *ataxy* to it, and that the Germans are not entitled to the credit of more than first using this designation. It is no

doubt true that in the earlier stage there is defective co-ordination rather than distinct palsy; but, while admitting this, it would be a mistake to suppose that there is more than a general resemblance to locomotor ataxy. Take two patients suffering respectively from these two diseases, and test their power of standing erect, without the aid of sight: the ataxic one staggers and would fall at once, while the paralytic, even when the disease is advanced, stands without much difficulty.

The author narrates four cases in illustration of the extension of disease from the cord to the brain, manifesting itself there by the symptoms of general paralysis. In case 1st, a labourer who had been following an employment which required him to stand up to the waist in water when at work, was seized with paraplegia. After about three years a general paralytic condition supervened, accompanied by the characteristic delusions of grandeur, and took about four years to run through its different stages before terminating fatally. At the autopsy the ordinary lesions of general paralysis were found in the brain, while in the cord there was marked grey degeneration of the posterior columns. In case 2nd, the patient had first suffered from ordinary locomotor ataxy, also the result of moist cold, and after several months paralytic dementia set in, from which he died. Lesions similar to those present in the last case were found on inspection. In cases 3 and 4, in addition to Duchenne's paralysis, early and complete amaurosis was manifested. Impairment of vision is, it need scarcely be said, a symptom of the first or cephalic stage of that form of paralysis, but this is only a temporary condition, and materially differs from the total and persistent blindness in these patients.

Besides cases such as have just been briefly described, Dr Foville narrates one of special interest that occurred in his own practice, in which paralytic dementia was consecutive to diphtheritic paralysis, and was, he believes, due to a propagation from the throat.

In two cases the point of departure would seem to be the optic nerves or their centres, as in both amaurosis preceded the paralytic dementia—in the first by three, and in the second by six years.

Next follows a case in which the prodromata of general paralysis and palsy of the *motor oculi* of the right eye appeared simultaneously. The general paralytic condition has been steadily advancing without any change in the affection of the third nerve.

About three years since, Dr Westphal directed attention to the occasional occurrence of a condition of the nervous system consecutive to severe attacks of smallpox and typhus fever, in which the symptoms closely resemble those of general paralysis, except that the optimism of that affection is not present. An abstract of that paper is published in the *Journal of Mental Science* for July, 1872. We subjoin a condensed report of an analogous case related by Dr Foville:—

A soldier of the line, age 28, was admitted into the asylum of Charenton, bearing the deep marks of confluent smallpox, which had been both recent and severe. His condition was most serious. The intellectual faculties and motor power seemed almost abolished; he could not move, nor pronounce an intelligible word, nor express an idea in any way. So ill was he, it was at first thought he had not many hours to live. "As he cannot stand on his legs, but slides off when seated in an arm-chair; as he is incapable of catching anything with his hands; as he produces only unintelligible sounds when he tries to speak; as he can swallow only half solid aliments, and that with some difficulty; it is impossible not to be struck with the very great analogy, not to say identity, between this state and that of paralytic dementes arrived at the final stage of their long malady. In reality, if one considers only the results of examination, it would be difficult to arrive at any other conclusion respecting the nature of the affection under which he suffers." This hypothesis, however, was untenable in view of the history, which showed that he had joined the army only a very short time before the attack of smallpox; and further, there was a nasal twang in all the articulate sounds he uttered that is not observed in general paralysis of an ordinary character, and was due to paralysis of the soft palate, similar to what sometimes arises in diphtheria.

The progress of the case established the difference between the cause to which this condition was due, and that on which the common fatal form of general paralysis depends, beyond the shadow of a doubt; for the patient gradually recovered both in mind and body, save that the *timbre* of his voice was not properly restored. He was dismissed seventeen months after admission.

The following are the conclusions of the author respecting the nature and origin of general paralysis:—

1. In almost all cases, general paralysis is a primitive cerebral disorder, a pathological individuality independent of every other affection of the nervous system.

2. Exceptionally, general paralysis may be consecutive to another affection of the nervous system, and result from the propagation to the cerebral hemispheres of an anterior malady, it may be of the spinal marrow, it may be of the optic or third nerve.

3. General paralysis may be consecutive to diphtheritic paralysis following membranous sore throat, in which case it may be due to a propagation from the throat.

4. Following acute febrile maladies, and notably small-pox, multiple disorders of intelligence and motility are sometimes observed, which might lead to their being mistaken for general paralysis; but the ulterior progress of the affection, and certain symptoms, particularly paralysis of the soft palate, show that it amounts to a kind of acute and temporary dementia, associated with a general paralytic affection consecutive to febrile maladies.

This of its kind is a good division of the forms of the disease. Exception might, perhaps, be taken to the first class, as no mention is made of the morbid condition of the spinal cord, which in many cases probably begins simultaneously with the affection in the brain; at least the symptoms often point to an early implication of especially the posterior columns of the spinal marrow. It has been shown, particularly by Dr Boyd, of Somersetshire Asylum, in this country, and by various German writers, chiefly Westphal, that disease of the cord is present, and generally in an advanced stage, in fatal cases of general paralysis.

In a paper entitled, "*One of the Numerous Actions of the Morale on the Physique*," Dr Cornette relates two interesting cases of the loss of hair after "moral preoccupations, profound and afflictive." In one case, after severe and unexpected mental harassment, a man, age 45, lost all the hair of his head in a few days, except a circle around the temples and occiput, where there were only thinly scattered filaments, broken, white as snow, and falling, contrasting forcibly with the strong, black, abundant crop which previously clothed the scalp. But besides, all his beard and the hair of his body quickly followed, with the exception of a few stray filaments on his chin. In addition, he became afflicted with a hypochondriacal melancholia. But what is especially worthy of attention, his voice, from being sonorous, became weak, without expansion. The tone was deep, though there was no hoarseness.

In the second case, in which a similar cause was in operation, M. V., age 56, was not a little surprised one morning on getting

out of bed and taking off his night-cap, to find a remarkable quantity of hair inside of it. Thereupon his first act was to pass his hand exploratorily over his head, when there came away a mass of hair not smaller than the first quantity. The astounded gentleman now looked at himself in the mirror, and discovered that his cranium was quite denuded. He further soon observed that his chin was as smooth as at ten years old, that all his beard, which he daily shaved, had deserted his face; and, lastly, that all the hairs of his body had gone the way of the beard. All this had occurred in one night. The voice was also much changed, being feeble and broken, and in a much greater degree than in the other case. There was no mental enfeeblement or disorder.

Dr Cornette refers particularly to the association of the loss of hair and alteration of the voice in relation to the development of the hirsute appendages, and the change in the voice at puberty.

"Alcoholism in its Mental Relations" is the title of a long, able, and exhaustive paper by M. Dagonet. After some observations regarding the effects of alcohol on the system generally, and particularly on the brain and spinal marrow, the author proceeds to discuss the functional disorders of the nervous system which it produces. Referring to its action on the special senses, "Rarely," he says, "does the sense of sight not furnish precious indications for functional diagnosis. These troubles of vision are numerous and varied according to certain conditions, such as the individual predisposition, the sensibility of the organ, the degree and nature of the intoxication, or, lastly, according as they show themselves in an acute form of the disease, or in a chronic condition on which a paroxysm has been engrafted."

He classes the symptoms into the phenomena of irritation and hyperæsthesia, and into those of anæsthesia or insensibility. In relation to the former group, he thinks there is a kind of tremulous condition amounting to spasmodic vibration of the nerve fibres, corresponding with that which agitates the muscular fibres, from which arises, in the early stage of the disorder, the impression of a kind of mobility and instability of objects.

A peculiarity in vision, of which illustration are given, occurs in certain forms of alcoholism. It is a kind of achromatopsy, characterised by a weakness and sometimes momentary loss of the power of distinguishing colours, particularly the secondary tints. Frequently in these cases other troubles of vision are experienced; for instance, diplopia, accidental weakness of general vision, &c.

Another condition sometimes observed is the prolonged retention of the impression of colours by the retina, though the power of distinguishing them is still retained. In this case the patient who can recognise blue, green, and yellow bands if passed in slow succession before him, fails to do so should they be passed quickly the one after the other. It is supposed to correspond with the condition in general sensation, when impressions, such as those of pinching, etc., are conveyed more slowly than in health to the sensorium.

The disposition to see objects all of a red colour is considered to be of more evil significance than when they appear in any other hue, as it is believed to be frequently associated with a commencing organic lesion.

Many patients cannot distinguish exactly the contour of objects. They complain that they have always before their eyes the appearance of smoke or a cloud of dust; that in the evening they see with difficulty; and that the field of vision often recedes. In some cases a feeling of fatigue and pain is experienced when objects are attentively looked at. This weakness is often temporary, like the other symptoms; it disappears when the person is restored to health. But it should be remembered that it is generally an indication of a certain gravity, and is met with frequently in the more severe forms of alcoholism, in those that have a tendency to dementia and paralysis.

The hallucinations of sight, like those of hearing, are almost constantly accompanied by moral depression, under the influence of which the patient remains constantly plunged in an anxiety more or less profound. It may be confidently asserted that it is not the sensorial delirium, nor the nightmare that comes at every instant to trouble sleep, which causes the state of fear, but it is rather the moral disposition itself that generates these singular and painful delusions; it almost always precedes them. In place of figures of animals, so generally present to the patient, he sometimes sees the spectres of relatives or friends long since dead; it may be a father, a mother, or perhaps a female acquaintance, whose cold and bony hand applied to his shoulder comes to redouble his terrors.*

Sometimes there is a hyperæsthetic condition of the sense of hearing, but occasionally an opposite state, that of deaf-

* A similar sensorial delirium sometimes occurs in other kinds of blood poisoning. This is well illustrated by a case at present under my care. The patient, a woman, age 55, has suffered from jaundice from organic disease of the liver for about five weeks, and is not likely to recover, though she is by no means exhausted. A few days ago she told me that on the preceding night, when awake, she believed she saw her dead husband, dressed as

ness, exists, both of them passing away soon after the system gets cleared of the alcohol.

General morbid sensations are also referred to the two orders of hyperæsthesia and anæsthesia. As illustrative of the former, Dr Dagonet mentions (though perhaps not very correctly) cramps, itchings, shocks through the system, etc. Bouchardat, in 1869, described a hyperæsthetic condition which presented itself in two principal forms : a superficial one, in which the skin is so sensitive that the sick person starts and utters cries on the least touch, and a more deep-seated one, where the pain appears to be in the muscles, or even in the centre of the bone.

Anæsthesia is seldom general. Usually it is localised and particularly in the toes or fingers, or a part of the forearm. The patients have often no consciousness of labouring under any such defect till their attention is directed to it. In some cases, of which a striking illustration is given, there is a remarkable slowness in the transmission of impressions.

Epilepsy and epileptiform attacks, of alcoholic origin, do not differ in their exterior manifestations from those due to other causes, though, in a general way, it is true that the former are more severe, and occur more constantly in a paroxysmal form than the latter, that is to say, in repeated attacks at brief intervals. Their effect upon the mental faculties is stated to be more profound than that of ordinary epilepsy.—The experience of the reviewer does not lead him to take so unfavourable a view of the convulsive seizures due to alcohol. While he writes, two cases of the kind are under his care. In one, a man of 40, four seizures have occurred, at intervals, in succession, of eight months, four weeks, and six months, all being after drinking bouts. The other patient is a man about 50, and he suffers markedly under chronic alcoholic tremor. He has only had one epileptiform attack, which occurred about eight months since. In neither patient do the intellectual powers appear to have suffered appreciably, though the *morale* of both, especially the latter, is low.

The prognosis of epilepsy, due directly to alcohol, is generally favourable; for so long as the patient, at least in the early stage, abstains from the use of intoxicating liquors,

he used to be during life, come into the ward, and walk to her bedside. He carried a coffin in his hands, to which he pointed, but said never a word, and then he went away. Her children and her mother, all dead, but seemingly clothed and in life, then entered, looked at her, and disappeared. She considered them all to be real at the time, but knew they were imaginary when telling me about them.

the fits rarely recur. Absinthe and the white wine of Paris, would seem to produce convulsive seizures more readily than the liquors used in this country. At any rate, the motor phenomena are referred to by Dr Dagonet as of frequent occurrence. Judging from my experience of an establishment into which such cases are apt to gravitate, I would say that with us, though, as I have indicated, by no means rare, they can scarcely be considered common.

In illustration of how, when developed by alcohol, they may recur from moral causes alone, Dr Dagonet relates a case in which the patient, who had been subject to severe convulsive fits after absinthe, but had been apparently cured for two years, was seized with them again in great intensity, when much alarmed by the bombardment of the quarter in which he resided during the siege of Paris.

It is pointed out that after these epileptoid seizures, attacks of mania of short duration are apt to occur, in which the individual may commit a serious criminal act, and have no recollection of it on recovery. This, it need scarcely be said, is a feature in epilepsy generally, and is not particularly common when it is of alcoholic origin, at least in this country.

Ephemeral mania, independent of epilepsy, is an occasional result of alcoholic indulgence. A patient at present in the asylum, under the reviewer's charge, is a good illustration of it. She is a stout woman, 37 years of age. There is no hereditary predisposition to insanity, but her system was probably in a susceptible state through anxiety about one of her children who had been ill for a fortnight. She confessed having indulged freely in whisky for several days before admission, and she had been excited and violent at home for 36 hours before removal. When brought to the asylum she was in a state of acute mania, and continued so for about six hours. Then she had a good sleep and awoke calm and rational; and now, after the lapse of a fortnight, is still well. She had no recollection of any thing that happened in the interval between the commencement of her excitement at home and her recovery in the asylum.

We have seen that epileptoid attacks, instituted by alcohol, may recur from moral causes alone; so it may be with the ephemeral mental disorders of similar origin. As this point is of some consequence occasionally in relation to medico-legal trials, we translate the paragraph referring to it:—"Dr Lasegue has already remarked that in similar conditions (chronic alcoholism) paroxysms of acute alcoholism

occasionally supervene in people who, during some time, have committed no kind of excess; slight incidents have been sufficient to cause an explosion of it; that is what one finds, for example, in prisoners confined during a considerable time, or in persons who have undergone treatment for a longer or shorter time in hospital. We could cite many remarkable cases in proof of this statement."

Illustrations of the ordinary forms of acquired insanity, any of which may be the result of alcohol, are given by the author, but they do not call for special reference, as, with the exception of a greater prominence of the hallucinations of vision and hearing, there is no peculiarity in the symptoms.

Besides the papers to which we have specially referred, there are interesting communications by Dr Christian, "On Wounds in the Insane;" Dr Drouet, "On Bromide of Potassium;" Dr Cullere, "On Melancholia and Stupidity"—a subject to which we particularly referred in our last retrospect; Dr Beothier, "On Classification and Diagnosis in Mental Maladies;" and a very able and comprehensive serial paper, not yet finished, by Dr Lunier, "On the Influence of Great Political and Social Commotions on Mental Maladies."

II.—FREE PHOSPHORUS IN MEDICINE; WITH SPECIAL REFERENCE TO ITS USE IN NEURALGIA. By J. ASHBURTON THOMPSON. London: H. K. Lewis. 1874.

THE use of free phosphorus, although recommended by many authorities, has not till quite recently been very extensively practised. The potency of the drug for evil was much more clearly before the mind than the certainty of its beneficial action. Not a few deaths had resulted from its medicinal employment, and, although the same may be said of almost every potent agent in the Pharmacopœia, most practitioners did not feel that they knew wherein the special element of danger consisted, or how to administer it efficiently and yet safely. The pharmacy of the subject, moreover, was far from clear, and the problem was how to introduce free phosphorus into the system by means of a vehicle which, while preventing oxidation, would dilute its local action and overcome its disagreeable taste.

Considerable attention, however, has been directed of late to all these points. The recent supplement to the British Pharmacopœia contains directions for two preparations in-

tended to supply free phosphorus—the Oleum Phosphoratum and the Pilula Phosphori.

Other pharmacutists both at home and abroad have been working steadily at the subject, and, above all, a body of clinical experience has been developed which goes far to settle the question on a surer basis than mere chemical, pharmaceutical, or other theoretical reasoning.

For the bringing together of all this information within a reasonable compass we have to thank the author of this little volume. Dr Thompson, moreover, discusses the historical part of his subject along with the rest, and has been able to derive from this department of his investigations certain corroborations of his conclusions otherwise reached. For all relating to the administration of free phosphorus, we can refer to this volume as summing up the information, and as quoting the literature of the subject; the value of the book in this respect would have been much increased by a good index for the purpose of reference.

It results from the author's researches and observations that phosphorus when administered in olive and other vegetable oils is more apt to produce dangerous consequences in relatively small doses than when it is exhibited in animal oils, ether, alcohol, and some other ways. He is of opinion that this is not due, as might at first be supposed, to the better preservation of phosphorus from oxidation in olive oil, but rather to these vegetable oils holding in solution so much more atmospheric air than the animal oils, and to the production thereby of hypophosphorous acid from the exposure of the phosphorus to a limited supply of air: this compound acts, he supposes, on the blood,—destroying the red corpuscles by its deoxidising power. The *British Pharmacopæia* directs the use of almond oil previously heated to 300° F., so as to destroy certain organic impurities; whether the method of preparation as thus recommended suffices to expel the air and overcome the objection stated above is not known, but Dr Thompson decidedly objects to experimenting with it when he has safer preparations at hand. The presence of food—and apparently of its oily ingredients—in the stomach seems to have been the occasion of determining, in certain cases, the more violent action of phosphorus administered in its solid form, owing to the solution of the drug and its entry into the system being thus favoured; the enormous doses recorded by some of the older writers, without any further inconvenience than a sensation of burning, &c., may have been due to the use of this agent at that time

in serious diseases where the amount of food in the stomach is usually small.

The following is Dr Thompson's formula for an oily solution :—

Take of Phosphorus	1 grain.
Cod liver oil	1½ oz.
Oil of peppermint	1 minim.

Of this one drachm contains one-twelfth of a grain. This is a useful but full dose. This preparation might be rendered even less disagreeable by the use of gelatine capsules. Dr Thompson does not object to the pills manufactured by Messrs Kirby and Messrs Cox, and he also admits the use of zinc phosphide as a means of administering free phosphorus, but he evidently regards the solution in cod liver oil as the safest form of administration, and as more satisfactory than the etherial solution, or any form of pills.

"The dose of phosphorus seems to vary very considerably with the formula employed. I do not venture to suggest a dose for solutions in vegetable oils. Of the solution in cod liver oil, I regard the equivalent of one-twelfth of a grain as a quantity which will yield whatever benefit is to be derived from the drug. That is the dose which will be found to give the most uniform results in a series of cases of neuralgia. If it be intended to continue a course of treatment for any period beyond ten days, the dose should be much reduced. Probably if it be given as a tonic, one-fiftieth of a grain in half an ounce of the oil will yield the best results. Of the alcoholic and etherial tinctures, I believe the equivalent of one-twelfth of a grain to be an average dose; an increase may be allowed to one-eighth of a grain if it be thought desirable. I prefer to increase the quantity taken by repeating the original dose every three hours, for example, as compared with intervals of four hours. I think the minimum dose of these preparations is one-twentieth of a grain.

"The dose to be given in the pills of reduced phosphorus ranges from between one-fiftieth and one-thirty-second of a grain. For ordinary cases one-fortieth may be considered as a sufficient quantity. For prolonged use one-fiftieth will be sufficient.

"Of the phosphide of zinc the full dose is about three-fourths of a grain. That quantity would invariably cause vomiting, and on this account I have never given more than one-third of a grain every two hours. If the drug be presented in a coated pill, sickness will very rarely be

witnessed. Except where otherwise stated these doses are calculated for repetition every four hours and for adult persons."

We have quoted these remarks at some length as we believe the gist of the book lies in the dose. Dr Thomson's remarkable series of cases of neuralgia (treated by phosphorus and nearly all cured) published in the *Practitioner* and reproduced in this volume, call for careful attention.

The experience of other physicians is far from being so favourable as that here cited, but it is quite open for consideration whether the much larger doses which the author gives, apparently with safety, may not account for the difference in the result. He thinks that in neuralgia full doses should be used from the first, and if relief be not obtained in 72 hours the remedy may be stopped.

This volume, of course, will serve its purpose if it can guide the profession to a fair estimate and trial of this potent drug.

III.—THE ESSENTIALS OF MATERIA MEDICA AND THERAPEUTICS. By ALFRED BARING GARROD, M.D., F.R.S. Fourth Edition, revised and edited, under the supervision of the Author, by E. BUCHANAN BAXTER, M.D. London: Longmans, Green & Co. 1874.

THIS new edition of a well-known work appears opportunely for students, as being in time for the winter session, and as incorporating the additions made in the supplement of the *British Pharmacopæia*, published this year. Some of the most important of these (Chloral Hydrate, for example) were noticed in the last edition of this work, and the present edition contains articles on some drugs not yet officinal (Croton chloral, &c.). There is not much alteration in the text of this edition and none in its general plan—this evidently has met with the approval of students. The description of the action of the various remedies seems to us rather meagre. In the notice of chloral, for example, which is re-written for this edition, there is no indication to guide the student as to whether and when a dose may be repeated if the first fails to act, as to the relative effect of this agent on young children, as to the use of the dose of this drug by enema, or as to the danger of the combination of even moderate quantities of opium with anything like a full dose of chloral. This danger was pointed out in these pages by Dr J. B. Russell, soon after the introduction of this drug, but the risk of the combination does not

seem to be sufficiently known, although not a few lives have been lost from an overdose of such a mixture. We are glad to see a word of warning regarding the danger of the habitual use of chloral, which has, unfortunately, sprung up in our midst; "profound melancholy and enfeeblement of the will, muscular lassitude, inability to sleep without the drug," are enumerated in this connection.

It would be out of place to prolong the notice of this well-known book; suffice it to say that, so far as its scope allows, it is admirable and even full, and that this edition is carefully corrected up to the present date.

IV.—AN EXPERIMENTAL INQUIRY INTO THE NUTRITION OF ANIMAL TISSUES.
By WM. MARCET, M.D., F.R.S. London: Longmans, Green & Co.
1874. pp. 52.

THIS pamphlet gives us the results of an original inquiry into the chemistry of the nutrition of animal tissues. We must, however, at the very outset, confess to considerable difficulty in accepting the somewhat long list of conclusions (in number sixteen), which the author appends to his essay. The feeling of doubt has involuntarily grown in our minds in the process of reading the essay, and it shall be our endeavour, in as few words as possible, to justify it to our readers.

It may here be stated that the reading of the essay has of itself been a task of considerable irksomeness, and this from the use which the author occasionally makes of the English language, and also on account of certain inaccuracies of expression which are sometimes misleading. For instance, we have the following sentence at p. 5:—"Therefore juice of flesh has a tendency to coagulation, as would a solution of gelatine;" whose grammatical structure it would be difficult to determine. Again, in another part, he is referring to certain substances which are held in solution, but which as they are present only in small quantity, he wishes to leave out of account. The mode in which this is expressed is as follows:—"By so doing a slight error was committed, as the extract consists of water holding substances in solution and not of pure water; these substances in solution, however, occupy very little space (*sic*); so much so, that I have determined experimentally that the error may be disregarded." (p. 12.) Here are two other examples which will suffice to show that his modes of expression are, to say the least of it, unusual:—"These two numbers representing the amount of albumen coagulable and albumen

calculated from the remaining (*sic*) of the nitrogen present in the extract, after separation of the true albumen, were added to each other, and the sum was subtracted from the nitrogen present in the total fibrous mass expressed as albumen." (p. 16.) "Now in the most common form of phthisis, as shown by Dr Sanderson, the process begins by a new growth of the interstitial tissue of the pulmonary honey-comb, having its seat in the very walls of the blood-vessel." (p. 46.)

Now, setting aside the unusual use of the present participle in the former of these quotations, we feel confident that most of our readers will require to read the sentence with very great deliberation before the meaning to be conveyed becomes apparent, and when this has to be done again and again, and page after page, the reading becomes in no small degree irksome.

But we have a more serious accusation to bring against Dr MarceZ than that of mere carelessness or inaccuracy of expression, although carelessness in this seems to presume carelessness in other and perhaps more important respects. We are not able, of course, to repeat Dr MarceZ's chemical experiments, but it seems easy to check his results when he states that "meat from slaughtered animals is perfectly free from blood," and when he repeats that "the oxen were slaughtered as usual, after being felled with the pole-axe, one or both of their jugular veins was opened, and the blood allowed to run out, so that the capillary vessels of the muscular tissue were quite empty when the flesh was removed for analysis." When we read these statements it seemed an easy thing to test them, and we accordingly forthwith ordered up a piece of beefsteak. It seemed to us on the face of it a very unlooked-for fact that flesh from a slaughtered animal contains no blood—we could hardly conceive of the capillaries becoming completely emptied in the process of bleeding from the jugulars. We had always been of opinion that the capillary attraction of these minute vessels was sufficient to retain to some extent both blood corpuscles and plasma. We were therefore not astonished to find that when a scrap of raw meat was torn out and spread under the microscope, the capillary vessels contained red blood corpuscles in abundance.

But it may be asked, how is it that Dr MarceZ comes to such an erroneous conclusion, and this, too, on the basis of experiment? The mere statement of the experiment gives us at once the explanation and a glimpse of the author's style of experimentation and reasoning. He says:—"On

trituration minced ox flesh with salt water, I could not find any blood corpuscles by subjecting various portions of the mass to microscopical examination, while on adding one or two drops of serum containing some blood corpuscles to a few ounces of the pulpy mass, and agitating the whole together, the blood corpuscles could be detected most readily." (p. 8.) It is obvious that Dr Marcet has looked for the blood corpuscles, not in the capillary vessels, but free in the salt water with which he had triturated the minced ox flesh. He seems to have entirely overlooked the fact that trituration does not necessarily expel the blood from the capillaries, and that even though muscular tissue be torn to pieces with needles yet there may be very little escape of blood from the capillaries. The confirmation which he derives from the discovery of free corpuscles which he had previously added, is a wonderful instance of the extreme simplicity of the author's ideas.

The manifest error of his statements as to the presence of blood in muscle, while it seriously invalidates the results of his chemical experiments, must still more seriously interfere with our confidence in his other more detailed observations. But even in these we have further evidences of carelessness, if not inaccuracy. Take the following—"The extract retained in the fibrous mass yielded (by calculation) 0.032 gramme of chlorine, and the fibrous portion and extract together 0.035 gramme of chlorine—the difference amounting to 0.003, or 0.001 gramme per 100 grammes of flesh, which is insignificant, and proves the absence of chlorine in the ripe or insoluble tissue." It is certainly difficult to understand how the calculated presence of 0.003 gramme of chlorine "proves the absence of chlorine." This mode of reasoning, however, is not unusual to our author, for he uses it in regard to soda a few lines further on.

If our author is inaccurate in the statement of his own results, it is to be expected that he will be equally so in quoting those of others. At page 9 he has occasion to refer to the views of Dr Beale, and to make use of them in support of his own, and here is the rendering which he gives of them—"Dr Beale ('Life Theories, &c.') believes that as soon as what he calls the bioplasm is transformed into the insoluble matrix of a cell, it dies, then disappears, and is replaced by other cells."

That Dr Beale believes any such nonsense, we think few besides Dr Marcet ever imagined. In this short sentence we have the most extraordinary travesty of Dr Beale's

views as to germinal matter and formed matter. To say that as soon as the bioplasm is transformed into the insoluble matrix of a cell it dies, then disappears and is replaced by other cells, is simply absurd, because we know that in the great bulk of the animal tissues there is no such continuous renewal of the elementary parts. If on the surface of the body we have a continual desquamation, the lost cells being replaced by fresh ones, this is an entirely exceptional and local phenomenon, and the statement does not in the least degree apply to muscle, with which Dr Marcet has to do.

We had marked for illustration a number of other statements of the author of this pamphlet, but we may be allowed to consider that quite enough space has been expended on it. The results of the experiments we do not care to refer to. If they were firmly established we do not see that they would be of any great moment, but as we have the gravest doubts as to the ability of the author to conduct experiments with scientific accuracy, it seems to be hardly worth while to endeavour to criticise them in detail.

V.—LECTURES ON FEVER. By WILLIAM STOKES, M.D., D.C.L. Oxon, F.R.S., *Regius Professor of Physic in the University of Dublin.* Edited by JOHN W. MOORE, M.D., &c., &c. London: Longmans, 1874.

CAREFUL readers have often experienced that uncomfortable confusion of the understanding which arises from want of definition of the terms employed. What a sense of discomfiture, of beating the air, of panting after a mirage, possesses one who toils through the pages of an author whose primary ideas are fallacious. We have sometimes experienced this bewilderment in reading books and papers by men who have no conception of a difference between typhus and enteric fevers. Nothing will compensate for the want of this distinction. What shall we say then to those lectures by Professor Stokes, who is not merely hazy as to this specific distinction, but who also merges all the forms of continued fever into one febrile process as "secondary affections," of which he enumerates symptoms and anatomical appearances, which we have been accustomed to call "complications" and "specific lesions" of distinct kinds of fever?

It is only out of respect for Dr Stokes (and who can fail to have a very high respect for him) that we think it necessary to allow him to convict himself. Let us quote this passage, which is repeated almost verbatim in two places

within twenty pages, an illustration of the literary slovenliness of the book. We prefer the version at page 88:—

"You know that we have not unfrequently in the wards the whole, or nearly the whole, of a family sick of fever. The patients have occupied the same dwelling, too often the same room, and they have sickened successively and within short intervals of time. It is difficult to believe but that there has been a similarity in the exciting cause of disease in all, and there is a strong probability that the sickness of one has promoted that of another. Now, in this group what do we find? Is it that the same character of fever affects them all? Nothing of the kind—one patient may be in maculated typhus; in another there is no eruption; in another the case is typhoid, or the so-called pythogenic or enteric fever; and so on among them. Even cases of rheumatic fever may occur. But this is not all; second attacks arise, but these are not necessarily—not, I might say, even commonly—repetitions of the first ailment or group of symptoms. In the typhus fever patient they may be those of typhoid; in the non-maculated there may be abundant maculæ. In the other cases similar circumstances occur, the second attack presenting types differing from the first: one has a short fever, another a long one; one a complicated, the other a comparatively simple attack; one with predominance of cerebral, another with that of pulmonary symptoms, and another with all those of enteric or pythogenic fever; one requiring stimulants in the second attack, though there was no failure of circulation in the first; and similar differences may be seen as to the remaining complications."

This reminds us of nothing so much as of one of Retsch's illustrations of Faust—a fantastic Walpurgisnacht of pathological and diagnostic ideas.

We heartily wish that Dr Stokes had never published this book. The day has long gone past when mere authority will serve as a gilding for opinion. In respect of fever, Dr Stokes is a thorough Rip van Winkle. Wendell Holmes tells us that men "prefer their doctors mouldy like their cheese," and for those whose taste is of this sort these lectures on fever must be a "*bonne bouche*."

VI.—A TREATISE ON FOOD AND DIETETICS, PHYSIOLOGICALLY AND THERAPEUTICALLY CONSIDERED. By F. W. PAVY, M.D., F.R.S. London: J. & A. Churchill, 1874.

DR PAVY has already given the profession ample proofs of his industry and ability in his works on Diabetes and Digestion. The volume now to be noticed may be regarded as the complement of the latter of these. It ranges over a very wide field, embracing a consideration of the alimentary principles, their classifications, chemical relations, and physiological uses. It discusses alimentary substances, animal and vegetable, beverages and condiments, and de-

scribes the processes employed for the preservation of food. Lastly, it treats of the principles of dietetics—practical and therapeutic dietetics.

To review such a comprehensive treatise would be a laborious and, in some respects, unnecessary task, and we must therefore content ourselves with drawing attention to some of the more practical points bearing on disease and therapeutics, referring our readers to Dr Pavy's book itself for the mass of valuable information it contains on other allied subjects. It may be stated, however, that the views enunciated as to the uses and value of the various alimentary principles are founded on the most recent chemical and physiological researches, and that these researches have refuted theories and ideas long favourably received.

The large portion of the volume devoted to a description of alimentary substances is peculiarly full and complete, furnishing ample details of their composition and dietetic value. The effects of unwholesome meat are discussed, and are classed by Dr Pavy as due to (1) the existence of parasites; (2) infectious diseases; (3) contamination by some drug or other noxious agent administered or consumed during life. The presence of the *cysticercus cellulosæ* in the flesh of the pig is the cause of "measly pork," which, when eaten imperfectly cooked, generates tapeworm. *Trichinæ* in meat, if not destroyed in the process of cooking, rapidly multiply in the alimentary canal, pierce the walls, pass through the peritoneal cavity, and diffuse themselves through the body. Fever sets in, the muscular system is affected with violent pains and contractions, and death may ensue. With respect to the effects of infectious diseases, Dr Pavy shows that it is not so clear as might be supposed that the flesh of animals dying from them is always hurtful, but irrespective of conflicting evidence on the point it ought undoubtedly to be rejected. The flesh of an animal treated by tartarated antimony produced poisonous symptoms in 107 persons, of whom one died.

Of fish there are, especially in tropical countries, some poisonous varieties, the symptoms generally being similar to those of cholera, while cutaneous eruptions and nervous disorders have also been observed. Fish are valuable articles of food when the digestive powers are feeble. "Of all fish the whiting may be regarded as the most delicate, tender, easy of digestion, and least likely to disagree with a weak stomach. It is sometimes styled the chicken of the fish tribe. The haddock is somewhat closely allied, but has a firmer texture, and is inferior in flavour

and digestibility. The sole is a tender and digestible fish. It also has a delicate flavour, and deservedly enjoys a high reputation as an article of food for the invalid. The flounder is light and easy of digestion, but insipid. In all cases where fish is required for a weak stomach, either boiling or broiling should constitute the process of cooking." Of the nutritive properties of oysters physicians are fully aware, and we agree with Dr Pavy that they cannot be difficult of digestion considering the impunity with which they are taken by many invalids.

Dr Pavy has an interesting chapter on animal foods, sometimes but not ordinarily eaten. Monkeys are eaten by the Chinese and others, and the flesh is reported to be palatable. 5000 cats are said to have been eaten in Paris during the siege, and in the same unhappy period, bears, rats, mice, and a camel were consumed. With regard to the horse, the practice of hippophagy is an ancient one. In fifteen European states besides France, horseflesh is eaten; and in the first 10 months of 1872, 750 horses were slaughtered in Berlin for the value of the flesh.

Impure water is now known to be a fruitful source of disease, the chief sources of unwholesomeness being excess of saline matter, the presence of organic impurities, and contamination with lead. "A large amount of saline matter may prejudicially influence (increasing or diminishing according to its nature) the action of the secreting organs of the alimentary canal, and so occasion constipation or diarrhoea; may aggravate the damaged condition existing in cases of dyspepsia, and possibly prove in some instances the source of calculous disorders, or at least, if not the source, may favour the formation of urinary gravel or calculi, when a tendency this way exists.

"There is conclusive evidence to show that the most serious consequences have arisen from the consumption of water polluted with organic matter. This, in fact, is the impurity that is most to be dreaded. Outbreaks of diarrhoea have been very distinctly traced to the use of contaminated water of this kind. It is acknowledged to be one of the most common causes of dysentery, and has been alleged, when derived from a marshy district, to be capable of inducing malarious fever and its concomitant enlargement of the spleen. From the facts that have recently been made known, there can be no doubt that typhoid or enteric fever has been frequently communicated through the medium of water. Some well established instances have lately been brought to light where milk adulterated with polluted water has been the cause of serious outbreaks of fever. Whether water charged with general organic impurity will

suffice to produce the disease has not yet been settled, but certain it is, that if it be contaminated with the intestinal excreta of a fever patient, either by the discharge of sewage, into a river, percolation from a drain or cesspool into a superficial well, or in any other way, it will do so. Probably the presence of sewage impurity in a particular state, apart from the specific poison, will occasion the disease, and it appears that it may be induced by impregnation with sewer gases allowed—through a defective service arrangement—to become absorbed during storage in a cistern. Cholera is another disease which may be considered as having been traced to contaminated water, and probably this forms the chief mode of its spread through a community. As with typhoid fever, the discharges from a cholera patient in any way reaching water that is subsequently consumed, may suffice to be the cause of a widely spread outbreak of the disease.”—Pp. 316-7.

It is only of recent years that sufficient attention has been paid to the influence of diet in the treatment of disease, and we cannot help expressing some regret that Dr Pavy has not devoted a larger part of his book to this branch of his subject. What he does say, however, is clear and to the point. The diseases in which the influence of diet is most marked, and has longest been recognised, are scurvy and diabetes. To the former there are only one or two casual references, while, as is natural, Dr Pavy contents himself with quoting the dietary for the diabetic, from his work on diabetes.

The effect of a highly nitrogenous diet, combined with sedentary habits, and the free use of the richer wines in the production of gout is noticed, but Dr Pavy does not commit himself to the proposition that an excess of nitrogenous food will of itself produce the disease. At the same time, he thinks it of importance that persons predisposed to the disease should avoid such excess. He agrees with the prevalent belief in the agency of port wine in its production, but is more liberal in the allowance of other stimulants, if taken in moderation, than most members of the profession. Thus he does not object to dry sherry, claret, burgundy, hock, and champagne, but admits that a pure spirit dilute with water is often the only safe alcoholic drink. It may be mentioned in connection with this that, in treating under “alimentary substances” of burgundy, Dr Pavy says: “An idea prevails that, unlike claret, burgundy encourages the development of gout. This may be so with a very sumptuous wine, presenting an approximation to port, but there

is reason to think that the charge is unfounded in the case of the ordinary burgundies that are met with in common use." Dr Pavy refers to the kind of food best suited for increasing and diminishing stoutness. He points out that "it is not wholly the question of food that is concerned, but also the temperament or organisation belonging to the individual. It is well known that whatever and however much some people may eat, they always remain thin, while others grow stout although eating comparatively little." A diet rich in fat, or carbo-hydrates, with a due proportion of nitrogenous matter, combined with exposure to heat and want of due exercise, must necessarily be followed by accumulation of fat, while the opposite will succeed in restraining the tendency to obesity. There can be no doubt of the results of following Mr Banting's dietary; but at the same time Dr Pavy points out that health may be seriously impaired by adhering too rigidly to it.

The influence of regulating the quantity of drink taken has, under certain circumstances, been long recognised. Dr Pavy is of opinion that a large quantity of watery fluid taken by those of sedentary habit, who live well, may rid the system of impurities, and that the beneficial effects of hydropathic establishments are in part due to the eliminative effects of the water drunk. If we add to this the regular hours, the plain diet, the action of baths upon the skin, and the occupation which the taking of these baths secures, along with the fresh country air, we have a most favourable combination of circumstances for securing health. At the same time, there is a limit to the water cure; and we have seen some disastrous results from a too long continued application of hydropathic means, especially in diseases of the nervous system.

The restriction of liquids is a well-known remedy for common colds, and has been found serviceable in pleurisy and in the treatment of aneurisms.

The urinary secretion is affected by the kind of food taken. Nitrogenous diet giving off nitrogen through the kidneys; it is of importance when these organs are affected, as in Bright's disease, that it should not be taken in excess. We all know, too, how the reaction of the urine may be affected by food; and in the lithic acid and phosphatic diathesis we regulate the diet accordingly.

Of chronic diseases, dyspepsia is the one which, more than any other, we are bound to treat mainly by attention to diet; and in other forms of gastric diseases, especially in

scirrhus, much may be done to alleviate suffering and prolong life by rigorous attention to the food administered. In constipation and diarrhoea the skilful application of dietetics is of great importance.

Dysentery and typhoid fever are examples of more grave affections, where the duty of the physician is to prevent intestinal irritation by the administration of bland food.

There are other diseases which improper food often aggravates, of which asthma and hooping cough may be taken as types. But in none ought the influences of diet to be overlooked.

We close these remarks, warmly commending Dr Pavy's book—the best and most trustworthy work on the subject which has fallen under our observation.

VII.—ARCHIVES OF OPHTHALMOLOGY AND OTOTOLOGY. *Edited and published in English and German by PROF. H. KNAPP, M.D., in New York, and PROF. S. MOOS, M.D., in Heidelberg.* Vol. III., No. 2, and Vol. IV., No. 1. New York : William Wood & Co. 1874.

It is a little curious that in a country which has produced so many eminent oculists, and which can still boast of men whose names are of world-wide renown in that department—a country, moreover, which is literally flooded with periodical literature of almost all degrees of merit, and on almost all subjects—there should be no journal devoted to a department of medical science which has, in the last fifteen years, made such gigantic strides as to render the classic work of Mackenzie (the last English edition of which was published 20 years ago) almost as much out of date as the older works of Wardrop, Laurence, and Middlemore. We are aware that the “Ophthalmic Hospital Reports” still continue to be published, and that they contain important and valuable articles on ophthalmic theory and practice; but they are published at very irregular intervals, and can only be looked upon as what their title indicates, namely, reports of cases treated in one of our numerous hospitals, and cannot be considered as occupying the same place as either the German or French Archives of Ophthalmology. For this reason, if for no other, we wish every success to the journal which our American cousins commend to our notice, and the two last numbers of which come simultaneously before us; for, in default of a journal published in our own country, we are glad to welcome one printed in our own language.

The present numbers contain some important articles in both the special departments to which the "Archives" are devoted. The New York editor, Dr H. Knapp, reports upon two cases of retinal glioma, on two cases of sarcoma of the choroid, and on one of sarcoma of the iris, the clinical history of the latter of these being furnished by Dr Argyll Robertson, of Edinburgh. Dr Knapp also contributes articles to both the numbers upon new forms of disc ophthalmoscope, which he has had constructed with a view to facilitating the estimate of the optical conditions of the eye. Those who are acquainted with Loring's ophthalmoscope will see no great novelty in Dr Knapp's inventions. The ophthalmoscope of Loring has for its distinctive feature a revolving disc containing lenses, situated behind the mirror, and so arranged that each of the lenses can be brought at pleasure to cover the central aperture; this disc is made moveable, and there are two other discs containing different glasses by which it can be replaced as occasion may require. The change of discs Dr Knapp considers to be the great drawback of Loring's instrument, and he first attempts to obviate this by constructing an instrument with two fixed discs, the one containing concave, the other convex glasses, and the edge of the one overlapping the edge of the other, so as to bring the contained glasses of the one, the other, or both, over the opening. This was found to be an improvement, and gave an almost infinite variety of combinations, but there was still much to be desired in point of portability and convenience. In the first number of Vol. IV., Dr Knapp describes a single disc ophthalmoscope, made upon the same principle as his double disc one, but with the whole of the glasses, 24 in number, crowded on to one disc. To accomplish this, it became necessary to reduce greatly the size of the lenses, so that they are merely bits of glass, little over an eighth of an inch in diameter. The author's opinion of his instrument is naturally high, and it is possible that its merits are a little exaggerated in the following paragraph:—

Although it has as extensive a series of auxiliary glasses as has hitherto been used in any ophthalmoscope for the determination of refraction—with the only exception of the double disc ophthalmoscope which I described in the preceding number of these Archives—no other advantages have been sacrificed to this particular purpose. The instrument is inferior to none of those I know as to convenience of use, durability of mechanism, protection of the glasses, absence of troublesome reflexes, purity and brilliancy of the ophthalmoscopic image. Yet it seems to me that no other instrument possesses all these advantages thus combined.

Samelsohn, of Cologne, contributes an elaborate article

on "Embolism of the central artery of the retina," in which he discusses the reasons for the different appearances described by different observers, and endeavours to deduce from these indications as to the exact position of the clot. He also discourses in the same number on "Galvano-cautery in Ophthalmic Surgery."

The articles on otological subjects are not less important and valuable, but it is only necessary for us to mention the names of Moos, Osear Wolf of Frankfort, Gustav Brunner, Wreden of St Petersburg, and Loewenberg of Paris, for our readers to understand that many of the most widely known and most talented of Continental otologists are contributors to the two numbers of the Archives now before us.

In the second of these numbers (Vol. IV., No. 1) a new feature is introduced in the shape of Ophthalmological and Otological Reviews, in which short epitomes are given of recent works in these departments. Busy men in these days, when, as Mrs Browning says,

Of writing many books there is no end,

cannot be too grateful to those who will take the trouble to read the books, digest them, and present the essence of them in a compact and easily assimilated form.

VIII.—THE THERAPEUTIC ACTION OF DRUGS AS DEDUCED FROM EXPERIMENTS ON MAN AND ANIMALS. By ALEXANDER G. BURNES, M.B., and F. J. MAVOR, M.R.C.V.S. London: Bailliere, Tindall & Cox. 1874.

AN EPITOME OF THERAPEUTICS. By W. DOMETT STONE, M.D. London: Smith, Elder & Co. 1874.

WHILE both of the above works are wholly devoted to therapeutics, the aim and object of each are widely diverse—the one endeavours to place therapeutics on a scientific basis, by determining the therapeutical value of drugs from their physiological action, as ascertained by experimental investigation; the other is simply, as is so far indicated by its title, a brief summary of the treatment of disease as inculcated by the leading British, American, and Continental physicians.

The object of the work of Messrs Burness and Mavor is one with which we very heartily sympathize. Advancement in therapeutics can, certainly, never keep pace with that which characterizes the other departments of medicine, unless such investigation be carried on in the scientific spirit and method advocated by the authors. In the first four chapters of their work, these gentlemen detail and exemplify the principles of therapeutical research which they advocate, and on which their own investigations have been

conducted. In the remaining chapters the physiological effects, specific action, and therapeutical uses of the more important agents of the *Materia Medica*, are successively described. The therapeutical principles inculcated by Messrs Burness and Mavor may be briefly summarized thus. In Chapter I., the specific action of various substances on the animal system in health is demonstrated. The phenomena of gout, and of the continued fevers, are alluded to in support of the statement that "in every disease primarily a special train of symptoms are evoked by some special cause acting in each case on some special parts or tracts of the system." It is then maintained that "the various agents used for remedial purposes exert an influence over special parts or tracts of the animal economy, and that the special range of symptoms produced by any one agent will vary according to the state of the body, the dose given, and the mode and form in which given, although in every case the same special parts or tracts will be more or less influenced." Various interesting examples are adduced in illustration of such specific influence, or of what is usually designated the physiological effects of the special agent.

Chapter II. is devoted to the elucidation of the proposition that the therapeutic value of drugs is to be deduced from their specific action on the healthy animal system. It is affirmed that "the same substance that influenced special parts or tracts of the body in the healthy condition will influence the same special parts or tracts in the diseased condition." But the caution is added that "when we wish to use any substance to restore the deranged function of any parts or tracts by its specific influence over them, doses considerably less than would be sufficient to produce the physiological effects of the special substance will serve by effecting some alteration in the nature or quality of the vital action." It is in this caution that the key-note is touched of what is regarded by the authors as the proper application to therapeutics of the specific action of drugs. It is explained that throughout their work a toxic dose means the quantity that is sufficient to produce the full physiological effects and cause death, and that a physiological dose means such a dose as is given in works on *Materia Medica* as the medicinal dose. They have, however, introduced a new posological term, viz., *restorative* dose, to designate the quantities given when a substance is used for its specific action on the diseased parts or tracts. Such proportions they say must be con-

siderably below the physiological or ordinarily recommended medicinal dose; but the exact quantity of each substance to be given for this purpose is a point to be determined, yet, by experiment. Of the many examples given in illustration of the value of specific treatment in restorative doses, we may mention the alleged great efficacy of Arsenious Acid in cholera, chronic diarrhoea, dyspepsia accompanied with diarrhoea, &c., of Ipecacuan in many forms of vomiting, dyspepsia, dysentery, diarrhoea, &c.; of perchloride of mercury in acute and chronic dysentery, &c., &c.

Whatever opinion may be entertained of the therapeutical doctrines propounded therein, it must be admitted that the work is one of great interest and worth, founded as it actually has been in great part on experimental investigation. The part of the work devoted to the enumeration of the physiological and therapeutical effects of medicinal agents might, we think, have been judiciously curtailed. The remarks on bismuth, castor-oil, croton-oil, elaterium, rhubarb, &c., are simply a repetition of what is to be found in any work on *Materia Medica*. We hope that when a second edition of this work is issued, the interesting experimental researches of its authors will have increased to such an extent as to render imperative the deletion of such simple repetition. We would very cordially recommend perusal of the work by practitioners and students.

Dr Stone's work will prove very useful to practitioners. The various diseases are arranged in alphabetical order, and the treatment recommended in each by the most eminent authorities successively detailed. Perusal of the work of Messrs Burness and Mavor leaves us with some feeling of certainty as to therapeutical efficacy. The work of Dr Stone, however, tends to give rise to a very different impression. Such effect is not to be attributed to Dr Stone, but to the nature of the work itself. When the opinions of so many different minds are stated, it is but to be expected that much contradiction should be evident, but the proverb that 'in the multitude of counsellors there is safety' is, we think, very far from being applicable to many of the opinions expressed in this work. Here we shall simply give one illustration, certainly a very striking example, involving as it does the most serious responsibility. In the treatment of typhoid fever Sir William Gull says, "If hæmorrhage occur, trust to it to cure itself, and keep the patient at rest in the horizontal position, giving a little opium (half a grain) by rectum, or mouth, if necessary, to quiet the intestines. Ice

may also be applied to the abdomen. The objection to giving lead, or gallic acid, or other powerful astringents, is that they are apt to make the patient sick, and in that manner perhaps to make the hæmorrhage worse." On the other hand, Dr Murchison, who is certainly the highest authority on continued fever in this country, says, "Hæmorrhage from the bowels during the first ten days is usually slight, and is readily checked by the acetate of lead and morphia, and the starch and opium enemata recommended for the diarrhœa. When intestinal hæmorrhage coexists with hæmorrhages elsewhere, large doses of the perchloride or pernitrate of iron will be found useful, and ergot (or ergotine administered subcutaneously) has proved most efficacious. When profuse hæmorrhage from the bowel occurs by itself at an advanced stage of the disease, the patient is in great danger, and Dr Murchison's experience is entirely opposed to the advice offered by Sir W. Gull, that it is best to trust to the hæmorrhage to cure itself." The evil influences of such differences of opinion cannot be exaggerated. While expressing our firm conviction of the truth of Dr Murchison's remarks, we feel impelled to add that too much caution cannot be exercised regarding the formation and expression of such opinions as that propounded by Sir William Gull. We are not aware of the amount of practical experience in the treatment of hæmorrhage in typhoid fever, upon which Sir William founds his belief, but certainly such experience would require to be very great, indeed, to warrant the adoption of such a conclusion. Our knowledge of the precise causation of, and our power of controlling the general course of the specific fevers are yet, unfortunately, so very uncertain as to render the expectant plan of treatment a thoroughly wise and prudent one; but, surely, our knowledge of therapeutics is sufficiently advanced to enable us to interfere with advantage in the treatment of complications, the nature of which we clearly understand.

In many aspects, however, the numerous opinions given in Dr Stone's work will prove very useful to the busy practitioner. We may refer in particular to the numerous idiosyncrasies of patients to the effect of drugs, &c., the existence of which render it so desirable that the practitioner should be full of therapeutical resource. Dr Stone has done the work he allotted himself carefully and well. The book is, we think, an unsuitable one for students, but it will undoubtedly be recognised by the busy practitioner as a valuable addition to his store of therapeutical knowledge.

IX.—A MANUAL OF PUBLIC HEALTH FOR THE USE OF LOCAL AUTHORITIES, MEDICAL OFFICERS OF HEALTH, AND OTHERS. *By* W. H. MICHAEL, F.C.S., *Barrister-at-Law*; W. H. CORFIELD, M.A., M.D.; and J. A. WANKLYN, M.R.C.S. *Edited by* ERNEST HART. London: Smith, Elder & Co. 1874.

THE Public Health Act, passed in 1871, for that exceptionally favoured part of the United Kingdom which lies to the south of the Tweed, has called into existence a host of Medical Officers of Health, who require special information. Two direct and immediate results have been, the publication of manuals or text-books of this special information, and the creation of a demand upon the schools of medicine for special courses of training and special degrees conferring academic certificates of fitness for the discharge of the highly important duties of those appointments. The "Manual of Public Health," edited by Ernest Hart, was announced some time before it appeared. No one acquainted with the pre-eminent qualifications of the editor could fail to have great expectations of the merits of this manual. His labours in the cause of Public Health are many and historic, but we doubt whether he has, in the present instance, enforced with sufficient firmness his editorial rights. His subordinates in the production of the Manual are each authorities in their sphere. The duties of a Medical Officer of Health are very diverse. Imposed upon members of the medical profession before special study had been generally required of medical students, it was impossible that any one man, excepting the editor himself and a few others who might be named, could fairly be expected at his own hand to produce such a manual. It was, therefore, a most likely mode of securing a perfect presentment of the best on all branches of those duties, to divide the work among men each pre-eminent in his own branch. No better could have been chosen than those who have co-operated with Mr Hart in the production of his manual; but still, almost in proportion to the pre-eminence of each in his own department, the co-ordinating conduct of the editor was necessary, and ought to have been exercised. Yet this is precisely what we miss, and this is all that is wanting to make the manual what we expected, but what we can hardly say that it is, the best possible book on the subject.

This Manual is divided into three parts, each of which has been entrusted to a different hand. The first part gives the legal aspect of the Medical Officer's duties; the consti-

tution and powers of the Local Government Board; the constitution and powers of the Local Authorities; the duties imposed upon, and the enactments to be enforced by the officers of the Local Authority, such as the laws affecting Sewers, Water Supply, Lighting, and Nuisances in general. An Index to Statutes pertaining to Public Health and to Powers and Penalties under the Sanitary Acts is appended. All this is from the pen of Mr Michael, Barrister-at-law. Although we Scotsmen are not benefitted by this exposition of English law, we can envy the Medical Officers of Health who abound beyond the Tweed the possession of a handbook so succinct and lucid of the legal aspects of their duties, from the pen of an authority so well acknowledged.

The second part is contributed by Dr Corfield, Professor of Hygiene in University College, who is also, as Medical Officer of Health for a Metropolitan District, skilled in the practice of the duties which he expounds. He treats of the daily work of the Officer of Health, the various matters regarding which he ought to have intelligent opinions, such as the removal and disposal of the refuse of communities, the Water Supply, the Management and Prevention of Epidemics, the Hygiene of the House, the relation of Trades to the common health, &c., &c. Here, this Manual may be useful to Medical Officers of Health irrespective of locality. We have been impressed with the good sense of the general advice given as to routine duties. Why the orders of the Local Government Board regarding the duties both of the Medical Officer and the Sanitary Inspector, after being given by Mr Michael at p. 49 and p. 60, should be reprinted *verbatim* by Dr Corfield at pp. 186 and 189, we cannot understand. This is a slight illustration of the want of editorial control.

But the third part of this book, and especially the chapter on Disinfection, gives the most glaring instance of the inconsistencies and self-contradictions which may be found within the boards of a book which is the work of several minds. It is no exaggeration to say that every process recommended by Corfield at p. 266 is condemned and pronounced ineffectual by Wanklyn at p. 369. Wanklyn opens his chapter on Disinfection thus—"There are two distinct kinds of infection, viz., the propagation of specific disease which reproduces itself, and the engendering of disease and unhealthiness by uncleanness and filth." Now, "the propagation of specific disease" is entirely a subdivision of "uncleanliness and filth." All contagia are, as we find them in practice, filthy and

unclean. They are all elements of excreta ; some of excreta given off by the lungs, some by the bowels, some by the skin. The only difference is that the filth is in one case gross and palpable, in the other it may be minute and imperceptible to unaided or uncultivated sense. Any divorce between the association of filth, in some degree, with infection is to be deprecated. Mr Wanklyn does not, as his illustration of the second kind of infection shows, refer to the disputed question of the generation of specific disease *de novo* from originally simple filth, but means to include that "simply weak state of health which is induced by living amidst filth" as a case of "infection." Such an extension of the meaning of the word is contrary to general usage, and would serve no purpose save that of obscuring still further a technical term which is already sufficiently obscured. The prevalent and fatal bronchitis of our large towns is no doubt in large part caused by the foulness of the general body of the air of those towns, but still more so by the foulness of the air of overcrowded and unventilated houses. Yet it would be as much a misnomer to call the action of the foulness in reference to bronchitis "infection," or the process of purifying the air "disinfection," as it would be to call the disease itself "infectious."

Altogether Mr Wanklyn's remarks on Disinfection are fantastic and impracticable. Nor does he approach the subject with a gracious intent. At p. 371 he tells us that "there is, perhaps, no other subject which has been so overlaid with absurdities as disinfection, and in this chapter an important part of our task is to point out how that which is commonly believed to be effective cannot possibly be so." So that his conception of the duty of the author of a "Manual of Public Medicine" is to demolish the usually accepted practice (which we may remark he does not clearly understand), and with what does he replace it? Here is the new doctrine: "In fire, which is quick, and *weathering*, which is slow, we have the two great natural disinfectants; and *against specific infection we have no others which are generally practicable.*" In short, Mr Wanklyn believes only in oxygen and dilution. The practice based upon this belief is the following:—"All clothes which are tainted with specific infecting matter, such as the matter from small-pox, scarlet fever, &c., ought to be burnt. When plague breaks out in a crowded part of a town, there is much to be said in favour of *burning down the houses where it has been rife.* Failing so extreme a measure (which, however, we would most seriously commend to the attention of the authorities of a

plague-stricken town), they should be, for a while, dismantled and freely exposed to the air and to the wind. There is no just reason for trusting to any fumigation with chlorine, sulphurous acid, or carbolic acid in any case."

Well may Mr Wanklyn assure us that he is "serious," when he recommends this as the course to be followed by "the authorities of a plague-stricken town." What dreadful circumstance he may mean by this mediæval phrase "plague-stricken" we can only guess. Scarlet-fever presently prevails in "crowded parts" of many "towns"—Liverpool, Glasgow, Leith, Perth, for example—and, we presume, Mr Wanklyn would call them "plague-stricken." We can fancy the neophyte of the English Public Health Act," having purchased this "Manual of Public Medicine," advising his Local authority to "Burn down the houses where it has been rife," with the mild alternative of "for a while dismantling and freely exposing them to the rain and to the wind!!" The proposal is as barbarous as it is absurd—barbarous in the sense of being worthy only of the dark ages as a scientific opinion. We marvel that the word "plague" did not suggest, both as necessary to make this method of dealing with infectious disease scientifically perfect, and as a natural companion idea, the further instruction to burn all the infected inhabitants in their houses. He does go so far as to say that their clothes and their beds must be consumed. Verily, if this is the best advice which chemists such as Mr Wanklyn can give, we are not astonished that Local Authorities are sceptical of the benefits of sanitary measures, and prone to regard disinfection as a kind of useless incantation, or like the antics of an African rainmaker. It is provocative of laughter, bearing in mind the modest method recommended by Mr Wanklyn for "plague-stricken towns," to read the following from the pen of Mr Michael—"In general, although contrary to all right action in sanitary matters, in the present state of the law and public feeling on the subject, *the less obtrusive* the action of a medical officer of health, the better will his employers and the public be satisfied!" (p. 38.)

Before passing from Mr Hart's Manual, we must express, and we do so with much concern and regret, our entire agreement with Mr Michael in his remark that the instructions issued by the General Board of Health, in 1851, to the Officers of Health appointed under the Public Health Act of 1848, "*are far in advance of those more recently issued.*" No one can compare the Regulations of the Local Government

Board, 1872, reprinted at p. 49, with the Minute reprinted at p. 39, and issued more than twenty years previously, without recognising, in the more recent document, the unwholesome leaven of Boards of Guardians, Vestries, and other representatives of vested interests. The Minute of 1851 is signed, "Ashley, Edwin Chadwick, T. Southwood Smith," and if Mr Hart's Manual is not all we hoped or desired, it certainly will do a good and sufficient work in putting before the medical officers of 1872, this enlightened, concise, and exhaustive state-paper, under the guidance of, and inspired by the liberal spirit of which Mr Simon and his staff have done so much noble work. We hope it will tempt them to read and study the series of Reports issued by Mr Simon, and unhappily cut short by Mr Stanfield. They are inexhaustible in the fulness of their information on all branches of Public Health, and a complete set of these Reports would be more useful to the young student of the duties of a health officer than all the manuals in existence.

X.—SANITARY ARRANGEMENTS FOR DWELLINGS, INTENDED FOR THE USE OF OFFICERS OF HEALTH, ARCHITECTS, BUILDERS, AND HOUSEHOLDERS. By WILLIAM EASSIE, C.E., &c., &c. London: Smith, Elder & Co. 1874.

For Mr Eassie's most excellent book, as for many other sanitary benefits, we have to thank Mr Ernest Hart, who possesses the invaluable editorial qualification of suggesting and instigating. We know of no greater pleasure that an intelligent and accomplished medical man can experience, than to meet an architect or civil engineer who is receptive and active in the appreciation and development of principles. Such a civil engineer is Mr Eassie. He is gifted with the faculty of apprehending and embodying in his work the most advanced ideas of sanitary science; and he also possesses the rare faculty of expressing himself with fluency and eloquence. He meets the medical profession with those friendly sentiments which furnish the only basis of co-operation for the public good. The best way to prove this and to indicate what is to be got in Mr Eassie's book is to allow him to speak for himself.

"It is due to the medical profession to state that its members have ever been foremost in pointing out the danger of many practices which were unwittingly prolonged by their architectural brethren. The uselessness of water-sealed traps when the air of the sewers is in a compressed state; the

necessity of ventilating house-drains; the danger of trusting to well-waters, except under certain circumstances; the reduction of phthisis consequent upon a well-ordered system of water-drainage—these are a few instances of their watchfulness. In all probability, but for the plain speaking of our physicians and surgeons, our habitations would be in desperate plight. The professions of medicine and architecture are in no way rivals. Both sciences are necessary to the realisation of a perfect piece of architecture, be it cottage, mansion, school-house, theatre, or hospital.

“When, however, a dogma of hygiene has been promulgated by the professors of medicine, the means of its mechanical enforcement are left to the architect and engineer. Thus, very often, the appliances which have been invented to carry out his own beneficial ideas are unknown to the medical man. Indeed, the descriptions of them are only to be found in architectural works or in price-lists. I shall therefore in the following pages endeavour to bring under the eyes of my readers illustrations and descriptions of the best sanitary goods.”

This is from the “Introduction,” and the titles of the seven following chapters into which the book is divided are these:—“Drainage”—“Traps and Trapping”—“Water, Earth, Ash-Closets, and Urinals”—“Cesspools and Old Brick Drains”—“Dampness”—“Warming and Ventilation”—“Gas, and Hot and Cold Water Supplies.” These chapters are illustrated with 116 diagrams, which enable those who are unskilled in apprehending technical details, as most medical men are, readily to understand all the structural intricacies of the subject.

A Medical Officer of Health cannot be too well up in all those practical questions involved in his daily duties. Owners of property and their tradesmen are only too prone to take advantage of the ignorance of the Sanitary Inspector or Medical Officer, and to presume that he will be bewildered in his enquiries into the pathology of drains, ventilation, plumber-work, &c., &c. Houses have their diseases like the persons who inhabit them, and such a book as this has the same relation to the daily duty of a Medical Officer of Health, as a Handbook of Anatomy and Pathology bears to the daily duty of the general practitioner in his investigations within the confines of the human body. Defects of drainage and other structural shortcomings of the habitation manifest themselves in various diseased conditions of the inhabitants. To establish the relation of cause and effect, which must be done before those defects

can be remedied, is a problem which the medical officer must encounter every day, and we know of no more essential aid in this great work, than Mr Eassie's book. "Architects, Builders, and Householders" are included in the title-page among those for whom it is intended. All are greatly in want of such information and instruction. The little hidden details of house construction here described, might be studied by our architects with more advantage to the public than the grand outlines and elaborate ornamentation of "The Stones of Venice." We may add also that the family practitioner would frequently find Mr Eassie's book useful in his almost daily enquiries into the hygienic arrangements of the houses of his patients.

XI. THE MORTALITY OF FLAX MILL AND FACTORY WORKERS AS COMPARED WITH OTHER CLASSES OF THE COMMUNITY, THE DISEASES THEY LABOUR UNDER, AND THE CAUSES THAT RENDER THE DEATH-RATE FROM PHTHISIS, &C., SO HIGH. By C. D. PURDON, M.A., M.B., &c., *Certifying Surgeon.* Belfast, 1873.

CONTROVERSY has run high at times, both within and without the medical profession, as to the necessity of Certifying Factory Surgeons, what good work they do in return for the considerable emoluments of their appointments, and altogether as to their *raison d'être*. We are not aware of what fruit the following circular issued by the Inspector of Factories to those gentlemen has produced, besides the valuable little pamphlet now before us by Dr Purdon, but if Certifying Surgeons would only follow the indications of this circular, and give us similar papers from time to time, we are quite sure no one would dispute the utility of their office. This circular appeared shortly after the "Factory Extension Act, 1867," came into operation, and is to this effect:—

"You will render a great service to the cause of Factory Legislation, especially in relation to its bearing upon the sanitary state of those engaged in manufacture, by collecting all information procurable respecting the Physical development, the frequency of deformity, prevalence of disease, and particularly of special disorders, the destructive effects of the principal kinds of labour, the average duration of life, the rate of mortality, and the prevailing cause of death among the several classes of workpeople coming under your observation. Similar advantage will also accrue from facts gathered concerning the circumstances and conditions (so far as they relate to the sanitary state of those employed)

of labour in any manufacturing process coming under your cognizance, and likewise the facts regarding the moral condition, prevalence of intoxication and state of education among the manufacturing classes of your district."

In compliance with the suggestions contained in this important circular, Dr Purdon has made a special investigation into the mortality of the Belfast district for 1872. He has divided the population into three classes. The first class contains the Flax Mill and Factory Workers, numbering 28,127; the second class embraces the Artisan and Labouring population, numbering 165,221; the third class is made up of the Gentry and Mercantile population, about 7000 in number. Various tables are given showing the deaths arranged in decades of age, and under five general heads as to causes of death, viz.:—Inflammatory diseases, Zymotic diseases, Phthisis and other Pulmonary diseases, Neurotic affections, and Decay of Nature. We give this classification as we find it, but in the absence of more detailed explanations, we confess to some difficulty as to the allocations of acute "Inflammatory Diseases" of the Lungs, such as Bronchitis, Pneumonia, &c. However, any doubt on this point cannot detract from the importance of Dr Purdon's results as to the direction in which they point, excepting by making them less emphatic than they might be, and they certainly are emphatic enough. His statistics show that the operatives employed in the Flax Manufacture suffer far more from Phthisis and other Pulmonary diseases than the other classes; nearly three-fifths of the annual deaths in this class being attributed to diseases of the organs of respiration against two-fifths in the other two classes.

Dr Purdon pursues his enquiry into the different branches of the Flax Manufacture, and states that "the death-rate among those employed in the Preparing Rooms is exceedingly high, being 31 per thousand, and that few of those employed in those rooms live beyond sixty years," which seems to us not a very grievous result! The reason is apparent from this fact, that the atmosphere of the Preparing Rooms "is constantly loaded with the Flax dust called 'Pouce.'" This term "Pouce" has been embodied in the melancholy slang of the trade as expressive of the cause of these pulmonary ailments. A worker in this department who has been attacked with bronchitis and dyspnoea is said to be "Poucey."

The etiology of the diseases so prevalent among workers in the Flax Mills is thus summarised by Dr Purdon:—

"The diseases from which Flax Mill workers chiefly suffer are those peculiar to the Preparing and Spinning processes. In the former, the lungs chiefly suffer from the constant inhaling of the 'pouce,' as already mentioned. The irritating quality of the dust is felt on the throat, which soon becomes dry. This irritation gradually creeps into the lungs, and produces chronic inflammation of the lining membrane, which soon manifests its presence by the worker being attacked each morning with a paroxysm of dyspnoea and coughing; the dyspnoea is sometimes so great that he takes hold of the table of the machine in order to enable him to get over the attack more easily; this state is so well known that, when a worker is seen suffering so, he is said to be 'poucey.' Those employed in the Roughing, Sorting, Hackling, and Preparing of Flax, suffer from this affection, and in the great majority of cases die from Phthisis, &c. Of those employed in the Spinning Room, the Spinners are frequently attacked with vertigo and fainting, and many accidents have occurred by their falling on the machinery. They also suffer from varicose veins and oedema of the ankles. The Doffers, &c., frequently, on their first employment in the mills, are attacked with a peculiar kind of fever which they call 'mill fever.' This comes on when they are a few days engaged at work. The symptoms are rigors, nausea, and vomiting, speedily followed by pain in the head, thirst, heat of skin, &c.; this state continues from two to eight days, when the disease subsides of itself. No treatment is required or sought for, as the worker knows that it runs a certain course and will leave him comparatively well, but rather weak for a few days, when he may return to his work without any fear of ever taking it again. The cause assigned for its origin is the smell of the oil along with the vapour and heat of the room. A peculiar eruption also attacks the uncovered parts of the body: this I call 'lichen.' I have never seen an adult affected with it. The cause of the eruption is said to be the effect produced by the Flax water on the young person's skin."

Dr Purdon, like a good physician, makes various important suggestions as to the prevention of those dire effects of this important industry, including restrictions on the age of "half-timers," improved ventilation, the compulsory use of the "Baker Respirator," special inspections of the health of workers, and more attention to the hygiene of the houses in which they live.

There are other important matters relative to the

dietetics of factory operatives and the relation of the employment of mothers in manufactures to the health of their offspring, on which Dr Purdon makes incidental but very important remarks. He observes the prevalent habit of feeding upon bread and tea, and the consequent frequency of "Tea Dyspepsia." He has "been enabled to institute experiments with respect to diet, showing how a change has affected several half-timers who were reared on bread and tea." The result is to show that a change from this diet to a mixed diet of tea, potatoes, and porridge has demonstrated its beneficial effect by a decided increase in the weight of the subjects of the experiments. The author's opinion as to the baneful influence of the diversion of mothers from their maternal duties, and the means to be employed to counteract this influence, are valuable.

"In order to lessen as much as possible the number of deaths that occur amongst children, each mother ought not to be allowed to resume work for at least one month after the birth of her child, and then should be obliged, when going to work each day, to bring her child to a public *crèche*, paying at the same time for its support a certain sum per week. She at present pays an old woman who farms them. The *crèche* ought to be visited weekly by the certifying surgeon, who is to inspect each child, and if he finds any suffering from want of maternal nourishment or disease, he is then to send a printed notice to the employer of the mother, stating that she is required to take care of her sick child. She is not to be allowed to return to her work until the child ceases to require her attention. The *crèche* to be under Government inspection."

We highly approve of those suggestions. Much charity and practical knowledge of the circumstances of the poor is required in legislating on this important matter. The position of a woman who, from being bereft of her natural support, is forced either to work for the maintenance of her offspring or to become a pauper, is much more deserving of sympathy than that of a woman—a lady—who, to gratify her love of society and from purely selfish motives, shirks the responsibilities of maternity.

In conclusion, we heartily commend to the notice and imitation of other Certifying Surgeons the example of Dr Purdon.

XII. THE PATHOLOGY AND TREATMENT OF DISEASES OF THE OVARIES. *By*
LAWSON TAIT, F.R.C.S.E. London: Smith, Elder & Co.

THIS reprint of the Hastings prize essay of 1873, is worthy of note as an able exposition of Ovarian diseases so far as they have been hitherto studied. A description of the Ovary in health precedes that of the changes produced by disease, and it seems very desirable that such a course should be followed in all pathological investigations. In this way pathologists would free themselves from the charge of not unfrequently pronouncing structures unhealthy, from imperfect acquaintance with normal conditions—or, as the author puts it—"in proportion as our knowledge of normal processes has grown, the riddles of pathology have come nearer to our understanding." Throughout the essay many subjects of interest arrest the attention, as, for instance—The probable causes of Ovarian hyperæmia—the dangers of hastily using the uterine sound—the lawfulness of exploratory incisions in certain cases of doubt—the results that may be anticipated from tapping Ovarian cysts, and the best method of performing the major operation—Ovariectomy. Viewing the essay as a whole, it is evident that the author is one who has at heart the advancement of scientific medicine in this department.

Exchange Journals.

By DR JOSEPH COATS, M.D., *Lecturer on Pathology in Glasgow University, &c*
VIRCHOW'S ARCHIV. VOL. LX.,

PART I.,

CONTENTS.—I. Cartilaginous and true bony formations in the penis of an adult, by Dr J. von Lenhossek, Pesth (Plate I.). II. Investigations on lupus, by Dr C. Friedländer, Strassburg (Plate II., figs. 1-4). III. On the granulation tumour of the iris, by Dr J. Hirschberg, Berlin (Plate II., fig. A.). IV. Aneurisma arterio-venosum retinale, by Dr H. Magnus, Breslau (Plate III.). V. On some observations made in the year 1873 on the cholera patients in the general hospital, Hamburg, by Dr F. Erman, Hamburg. VI. Hernia retro-peritonealis, with remarks on the anatomy of the peritoneum, by Professor Waldeyer, Strassburg. VII. The tuberculosis of the middle and internal ear of swine, with remarks on the anatomy of the temporal bone of this animal, by Dr Schütz, Berlin (Plate IV.). VIII. Experimental investigations on the functions of the brain, by Professor H. Nothnagel, Freiburg. IX. Smaller communications—1. On giant-cell sarcoma, with references to the work of Dr von Rustizky, by Rud. Virchow; 2. Bartolommeo Eustachio, by the same.

I. Cartilage and Bone in Penis (*Lenhossek*).—In this paper a case is recorded in which cartilage and true bone occurred in systematically arranged lamellæ in the body of the penis. The relations of the parts are minutely described and figured. A number of recorded cases are referred to by the author, and the opinions of surgeons are given.

II. Investigations on Lupus (*Friedländer*).—The observations in this paper are of great interest to the histologist, and also indirectly to others. The subject of investigation is the exact nature of the growth which occurs in the skin in lupus. We all know that lupus presents itself primarily in the form of small nodules, and that while these nodules ulcerate or cicatrize, the disease spreads by the formation of fresh crops of nodules at the periphery. The important matter, of course, is the nature of these nodules of which the affection primarily consists. Virchow and his followers consider them to be of the structure of granulation tissue, and that author classes lupus among his granulation-tissue growths. Rindfleisch has described the nodules as if they were related to the sebaceous glands, and considers that the disease is one primarily of these glands. His views, however, have not been confirmed, and the present observations are opposed to them. The author so far agrees with Virchow that he finds in lupus a very great infiltration of the true skin with round cells like those of granulations. But in the midst of these infiltrations he finds structures which seem to have hitherto escaped observation, but to which great importance is attached. These are numerous very small globular growths composed of cells larger than those of granulation tissue. In the centre of these minute nodules there are always one or more giant cells. Similar structures are found in neighbouring lymphatic glands, which to the naked eye present the usual appearances of scrofulous glands. Now, the author agrees with the views recently enunciated by Schüppel as to the structure of tubercular growths, and the nature of the scrofulous affection of the lymphatic glands (see this Journal for 1873, p. 413), and he identifies these little growths in the midst of the infiltrated skin in lupus, and in the neighbouring lymphatic glands as tubercular nodules. He, therefore, looks on lupus as a local tuberculosis, and compares it with the same disease in the brain, joints, testis, kidney, &c. These minute globular bodies fulfil the three criteria of tubercles—1, they are in the form of numerous globular nodules; 2, they have the structure of tubercular nodules, including non-vascularity; 3, they present a similar tendency to degenerate.

V. Observations on Cholera (*Erman*).—There is not much to note in this paper, although it contains a quantity of valuable material. One point which was carefully observed is the temperature of the cholera patients. It has been stated that in cholera the mercury very slowly rises to its maximum when the thermometer is placed in the axilla, but the author disputes this. Of 226 cases in which the temperature was carefully taken in the vagina or rectum, as well as in the axilla, there were 109 in which fever was present (temperature over 38.1° C. or about 101° F.), and 117 in which there was no fever (36°–38° C.). He could find no explanation in the symptoms of the various cases of this difference. Another point worthy of notice, is the question of the presence of bile in the stools. He states that in children, the cholera stools are generally bile-tinged, and that, therefore, the absence of bile is not pathognomonic. The treatment adopted was a tablespoonful of port-wine, or an equivalent quantity of brandy, every hour during the attack, and ice *ad libitum*. No other treatment was used in the bulk of the cases; quinine was tried at first, but as no benefit appeared it was given up.

VI. On Retro-Peritoneal Hernia (Walleyer).—The original subject of this paper is a case of large retro-peritoneal hernia, but the author afterwards proceeds to describe the various pouches of the peritoneum, and the relations of these to retro-peritoneal hernia. The case referred to is one in which the entire small intestine was contained in a large sac, whose opening was opposite the caput cæcum. From examination it appeared that the hernia had taken origin in the pouch which is situated in the posterior wall of the abdomen, and which has been named the fossa duodeno-jejunalis. The gut had got pushed into this pouch, carrying before it the right fold of the mesentery of the descending colon. The distended pouch was also somewhat displaced, its neck, which was originally at the level of the termination of the duodenum, had been dragged as low as the caput cæcum. We have thus a hernia entirely within the abdomen, containing the entire small intestines. There was no strangulation, or any inflammatory change. The author describes three small retro-peritoneal pouches which are normally present in the abdomen, the one already mentioned, one connected with the mesentery of the sigmoid flexure, and a third related to the cæcum. It will be enough for us here to describe briefly the first of these. He finds this duodeno-jejunal pouch to be present in about 73 per cent. of the bodies of persons dying of various diseases. It is usually large enough to admit the ungual phalanx, and it lies exactly at the place where the duodenum passes into jejunum, and the latter rises from the vertebræ and gets its own mesentery. The pouch is funnel-shaped, and passes down along the border of the duodenum between it and the aorta. The author ascribes the formation of this pouch to the course of the inferior mesenteric vein. This vein has its radicals in the descending colon, and passes upwards to join the splenic. In the foetus the mesentery of the descending colon is at first pretty long, and the vein has a comparatively straight course to the splenic, but as the mesentery contracts the vein is pulled to the left, and takes a more curved course, and a fold of peritoneum forms itself around it, just as the suspensory ligament of the liver is formed around the umbilical arteries. This prominent fold of peritoneum gives origin to the pouch, which has, therefore, the inferior mesenteric vein at its external or left border. The shortening of the meso-colon above referred to is caused, according to our author, by the growth of the kidney, whose capsule is formed in part at the expense of the meso-colon. In confirmation of this, it is noted that the transverse colon, and the descending colon beneath the kidney (sigmoid flexure), have a long mesentery.

VIII. Nothnagel's Experiments on the Functions of the Brain (Nothnagel).—While Fritsch and Hitzig and Ferrier have been endeavouring to discover the functions of the brain by irritating minute portions of it by electric currents, Nothnagel has been occupying himself on the same subject by a different mode of investigation. By the introduction of a perforated needle, and the injection of a minute drop of a solution of chromic acid, he kills a small portion of brain substance, while he hardens the portion of tissue killed, thereby rendering it possible to distinguish it accurately after death. A description of the method, and some of his former results, will be found in this Journal, August, 1873, p. 547, and it is there noted that destruction of the nucleus lenticularis on one side caused paralysis, which was, however, evanescent. In the present paper the results obtained by destruction of both nuclei lenticulares are described. The animal after the operation lay perfectly motionless, with not the faintest attempt at a voluntary movement. If leg after leg was gently pulled out, and the animal laid on

its side with the legs stretched out, there was no movement—it was just like a wax figure. But now if the tail were pinched, the animal gave one spring, drawing in its legs, and resuming the usual posture. This experiment could be repeated again and again, and the effect could be produced by irritating other parts besides the tail, the movements being more violent than those of a sound animal, but always with an automatic appearance. When untouched, the animal will remain hour after hour without movement. The author endeavours to explain these peculiar phenomena, by supposing that by the destruction of the nucleus lenticularis the communication between the voluntary centres of the cortex of the hemispheres and the lower centres, is interrupted, the voluntary impulses may be started in the cortex of the hemispheres, but they fail to reach the motor centres, just as in cases of fracture of the vertebræ, a man may will to move his legs, but the communication is interrupted. According to this, all the lines of communication which conduct voluntary impressions from the cortex to the lower centres, meet in the nucleus lenticularis. It is not at all inconsistent with this view that rabbits whose nuclei lenticulares are destroyed, can stand, and can make the violent leap already described; for animals whose whole cerebral hemispheres have been destroyed have equal capacity for these acts. Clinical observation also confirms this view. Hemiplegia, due to injury of the nucleus lenticularis, is said to be usually permanent. The paper before us gives the results of some further observations. In the previous experiments already alluded to, it was found that when a particular spot in the nucleus caudatus (corpus striatum) was irritated, the animal set off running violently, and the author for this reason calls the spot the *nodus cursorius*. He finds that after the nuclei lenticulares have been destroyed, irritation of the *nodus cursorius* still causes the animal to run about. There is this difference, however, that when the *nodus cursorius* is irritated in the uninjured animal, it continues to rush about in spite of obstacles till exhausted, whereas when the nuclei lenticulares are first destroyed, it begins to run spontaneously, but stops at obstacles, and only resumes its running when irritated, as by pinching the tail. The destruction of both nuclei caudati is difficult to effect. When successful, the animal remains quiet for a quarter to two minutes, and then begins to rush about in a more violent manner than after irritation of the *nodus cursorius*. The animal is also very sensitive to auditory and visual impressions, but not to tactile. These symptoms pass off in a few hours, and the animal seems hardly pathological.

PART II., MAY, 1874.

CONTENTS.—X. Anatomical studies on relapsing fever, by Dr Ponfick, Rostock (Pls. V. and VI.). XI. Experimental investigations on coughing, by Dr O. Kohts, Strassburg. XII. Embryological and histogenetic investigations on the sympathetic and cerebro-spinal nervous systems, by Dr A. Lubimoff, Moscow (Pls. VII. and VIII.). XIII. The rent in the mucous membrane—a contribution to the pathology of the larynx—by Dr C. Stoerk, Vienna. XIV. Smaller communications—1st, A case of syphilitic meningitis, with observations on syphilis of the central organs—by Dr Bruberger, Berlin; 2nd, Cleft of cæcum, bladder and genital organs, spina bifida, defect of abdominal muscles around the umbilicus, by Dr S. Behrendt, Stettin.

X. *Post-mortem Appearances in Relapsing Fever (Ponfick).*—This paper gives a very clear account of the appearances observed in the bodies of 100 persons who died from relapsing fever in the Charité in Berlin.

These were all males except one, and they were mostly inebriates, who presented the fatty overgrowth and loose muscles of drunkards. The most important local lesions were those of the spleen, medulla of bones, and respiratory organs, and these we shall describe more in detail. The liver was usually enlarged, but it was difficult to make out very definitely the conditions apart from the usual alterations in drunkards. There is said to have been cloudy swelling of the hepatic cells, and some cellular infiltration around the portal vessels. The kidneys were always enlarged, and there were evidences of tubular inflammation, with tube casts, and occasionally hæmorrhage between the vessels of the Malpighian tufts and the capsules. The muscular tissue of the heart was in almost all cases flabby and fatty, sometimes fatty in an extreme degree. The spleen was always greatly enlarged, so much so that rupture of the capsule occasionally took place, causing hæmorrhage into the peritoneal cavity, with or without inflammation. The enlargement was like that in typhoid fever, and concerned the pulp, which contained red blood corpuscles in all stages of retrograde metamorphosis, and cells containing fat granules in greater or less quantity. During life the blood of patients was found to contain cells in a state of fatty degeneration, resembling the endothelium of blood vessels. But, in addition to this general enlargement, the spleen often presented certain local lesions, depending on affections of its vessels. These affections were of two kinds, according as the veins or arteries were concerned. In the former case, appearances were produced exactly like those which result from embolism, but without any disease of the heart or obstruction of an artery. There were the usual wedge-shaped infarctus, the smaller of which shrink and leave a pigmented cicatrix, and the larger acquire a reactive zone and pass into suppuration and abscess. The abscess may cause inflammation of the neighbouring peritoneum or pleura, or may burst into the peritoneum and cause general peritonitis. When the arteries are affected there are numerous small, pale yellow spots, about the size of pin heads, generally in groups. These depend on the enlargement and fatty degeneration of the Malpighian bodies. The medulla of bone presented lesions strictly like those of the spleen. There was a diffuse affection which was not easy to recognize except by the microscope, but also a localised one going on to suppuration. Some of these abscesses are pretty large, as may be seen from the coloured figures given. The author supposes that, in the case of the smaller ones, the pus may be absorbed and the abscess converted into a cyst. But the larger ones must at some period discharge externally, and it is very possible that many of our chronic affections of bone may be due to this sequela of relapsing fever. He suggests to surgeons to make this enquiry as to the history. The affections of the respiratory organs were various, consisting of pneumonia, inflammation and cedema of the larynx, &c. Sometimes an acute cedema glottidis was an active constituent in the cause of death.

XI. Experiments on Coughing (*Kohts*).—These experiments were made on cats and dogs, with a view to determine the nervous agencies concerned in the production of coughing. Irritants of various kinds were used to produce coughing, mechanical (as tickling by feather, pinching &c.), thermal, or electric. He comes to the conclusion that coughing is chiefly a reflex action produced by irritation of certain nerves and branches. He has determined this experimentally for the following: the stem of the pharyngeal, superior laryngeal, and pneumo-gastric; for the peripheral expansion of the pneumo-gastric in certain regions, namely, pharynx, larynx, trachea, and bronchi; for the pleura costalis, and the œsophagus. According to his experiments there is no proof of cough from irritation of the stomach. He has

also determined experimentally that coughing may have its origin in an affection of the central nervous system; it may be produced by direct irritation of the medulla oblongata.

XII. The Nervous System in the Fœtus (Lubimoff).—We have here a large amount of interesting material, interesting, however, chiefly to special observers who will consult the original paper. It may be proper here to notice the author's method of observation. He obtained nine fœtuses under the fifth month, and it is these chiefly which he has made the subject of observation. He examined their nervous tissue in the first place fresh, by tearing up, and then set the fœtus to harden in a solution of bichromate of potash, of various strengths up to 2 per cent. (bichromate of ammonia would be better, according to Boll and Gerlach). The tissue is so soft that it takes seven or eight months before it becomes hard enough to make fine sections. His sections were always made *in situ*, that is, without removing the organ from the body, for by this means he avoided handling the delicate object. The fine sections were examined in water or salt solution, or were mounted for preservation. For permanent preservation he used two methods; he either tinted with picro carmine and then placed the section in a concentrated solution of acetate of potash; or after tinting, washed with water slightly acidulated with acetic acid, then placed in absolute alcohol, and after the water was completely expelled by alcohol, rendered the preparation transparent by oil of cloves, and finally mounted in dammar.

XIII. Rent in the Mucous Membran of the Larynx (Storck).—According to the author, this is an exceedingly common result of chronic laryngeal catarrh. In this affection the mucous membrane is swollen, and that part of it which lies in the cleft between the arytenoid cartilages often becomes very much so. It sometimes reaches three times its normal thickness and may project between the cartilages, and so hinder the shutting of the glottis, thus producing hoarseness. The epithelium on the surface of the swollen membrane also gets swollen and eroded. And now a deep inspiration may tear the thick mucous membrane, and, once formed, the rent is apt to deepen. After a time, the transversus muscle may be interfered with by the rent almost reaching it, and a permanent aphonia result from this muscle being unable to close the glottis. The subjective symptoms are often very marked, but may be very insignificant. After the occurrence of the rent, the inspiration of cold air produces a feeling in the larynx as if a raw surface were exposed at a definite spot. Then there is often a feeling of tickling at the same spot, and hawking to relieve it. This spot is also particularly irritated by swallowing irritating fluids, especially alcoholic. Later, cough supervenes, but it is a cough hardly to be distinguished from hawking. Hoarseness is also a common symptom, which may be caused either by the swelling of the mucous membrane or paralysis of the transversus muscle. Occasionally an acute inflammation is set up with cramp of the larynx. The treatment of the affection is the application of astringents, and the cauterization of the edges of the fissure. But the cauterization must be very carefully executed, the caustic being applied exactly to the edges, else serious damage may be done. For the cure of the fissure itself, such an application of nitrate of silver in substance is usually necessary.

PARTS III. AND IV., JULY, 1874.

CONTENTS.—XV. The putrid poison, bacteria, putrid infection or poisoning and septicæmia, by Dr P. L. Panum, Copenhagen. XVI. New

investigations and clinical observations on human and cow's milk as nourishment for children, by Dr Ph. Biedert, Worms. XVII. A case of congenital bony ankylosis of the left maxillary articulation, by Dr B. Solger, Heidelberg (Pl. IX.). XVIII. Comparative experimental investigations on the physiological action of the ergotins of Bonjean and Wigger, respectively, by Dr H. Köhler, Halle (Pl. X.). XIX. New investigations on whooping-cough, *Tussis convulsiva*, pertussis, and on the development of the whooping-cough fungus, by Dr L. Letzerich, Braunsfels (Pl. XI.). XX. Investigations on erysipelas (from Prof. v. Recklinghausen's Institute at Strassburg), by Dr W. Lukomsky, Kiev (Pls. XII. and XIII.). XXI. On *coccobacteria septica* (Billroth) in the healthy vertebrate animal (from Kühne's Institute at Heidelberg), by Dr E. Tiegel. XXII. Experimental contribution to the action of alcohol in fever, by Dr G. Strassburg, Bremen. XXIII. On the albuminous substances occurring in urine, and their relations to the various forms of kidney disease; on tube-casts and the exudation of fibrine, by Dr H. Senator, Berlin. XXIV. Smaller communications—1st, A glance at medicine in Spain, Part VI.—by Dr S. B. Ullersperger, Munich; 2nd, On the decomposition of iodide of potassium in the organism, by H. Kümmerer, Nürnberg. Index to Vols. LI.-LX.

XV. Putrid Poison, Septicæmia, &c. (*Panum*).—The name of this author is well known in the discussion of questions concerning the symptoms produced by decomposing substances in the human body. For some years he has been prevented engaging in the discussion, and now he returns to it to find that most of his earlier views have been confirmed. The question with which this paper chiefly deals is, whether the symptoms which undoubtedly result from the introduction of putrid substances into the body, are due to the existence in these substances of certain active organisms (chiefly the *Bacterium termo* of Cohn), or to some poison, possibly related in its production to these organisms. He comes to the conclusion that in decomposing substances there is a definite chemical poison which, in its composition, is more related to the vegetable alkaloids than to albuminous substances. This substance probably consists of several poisonous matters, it is not destroyed by boiling, is soluble in water, but precipitated by strong alcohol. The poison is probably produced by the vital processes of the bacterium, and may be either a secretion of this organism, or a product of the decomposition of albumen. He comes to these conclusions on what appear to be sufficient grounds. If a putrid solution be boiled for eleven hours, or filtered several times till it is perfectly clear and free from bacteria, it still produces the symptoms of putrid poisoning. Or, if the fluid be evaporated to dryness, and the residue extracted, first with alcohol and then with water, the alcoholic extract does not produce the symptoms while the watery does. The bacteria which produce this poison exist in the mouth and intestine of man, and very probably pass occasionally into the blood and tissues, but in these they seem incapable of living, till a certain time after the death of their host. In the intestine they probably produce the putrid poison, but the mucous membrane seems incapable of absorbing it, this being parallel to the fact that curare is not absorbed by the intestines. On the other hand, the putrid poison is often absorbed from the surface of wounds, and the characteristic symptoms are produced (Septicæmia). It seems that this putrid infection is not inoculable. It should, however, be noted that there is, according to some, a disease which depends on the existence in the blood of a distinct organism, an organism different from the bacterium *termo*, and which has been named by Klebs, the *Mikrosporon septicum*. This organism seems, under certain

special circumstances, when its germs exist in the air (specially in crowded hospitals), or when it is carried from one patient to another, to be able to exist in the blood and tissues, and increase there. It produces serious inflammations and suppurations in the parts to which it is carried; in fact, it is the active agent in the production of pyæmia. In many cases there will be the combination of the putrid poison with this active organism, and in these cases the symptoms will be partly pyæmic and partly septic in character. The author at the end of his paper suggests that greater care should be exercised in using terms in describing the conditions treated of. Septicæmia, if used at all, should be confined to the symptoms produced by the putrid poison. It seems that from this putrid poison, which is a composite substance, it is possible to separate a definite substance, "sepsin," and its introduction into a living animal produces symptoms. But this should not be called septicæmia, but rather sepsin-poisoning, and it would even be better to speak of putrid-poisoning when referring to the whole poison, than of Scepticæmia, a word which is somewhat indefinitely used.

XVI. Human and Cow's Milk for Infants (*Biedert*).—It appears that cow's milk differs from human, chiefly in respect that the casein is more abundant and more difficult of digestion. The author recommends for artificial feeding a cream mixture, which he has found, by experiment, most successful. The following are his proportions:—Cream, $\frac{1}{2}$ litre ($4\frac{1}{2}$ ounces); boiled water, $\frac{1}{2}$ litre ($13\frac{1}{2}$ ounces); lump sugar, 15 grammes (about 4 drachms, or about six good teaspoonfuls).

XVIII. Effects of the Alcoholic and Watery Extracts of Ergot (*Köhler*).—This paper describes the results obtained by a series of comparative experiments with the substances to which the name "ergotine" has been incorrectly applied. The ergotine prepared by Wigger is an extract of the constituents of ergot, soluble in alcohol but insoluble in water; whereas that of Bonjean contains the constituents soluble in water but insoluble in alcohol. It is obvious that these substances, although called by the same name, must be very different; and it also appears that neither of them is a distinct chemical compound, such as quinine or morphia, and it is misleading to call them by a name suggestive of that. It seems that Bonjean's ergotine (the watery extract) stimulates the depressor centres in the heart, and the vaso-motor centres in the medulla oblongata, thereby producing slowness of pulse and contraction of the arteries, with consequent increase of the blood-pressure. Large doses paralyze the heart. Wigger's ergotine has no influence on the heart or arteries. It, on the other hand, acts as an acrid poison, irritating mucous membranes, and even producing convulsions. Both ergotins reduce the temperature and retard respiration, but Wigger's more than Bonjean's. (In dogs, Bonjean's even accelerates respiration.) Bonjean's ergotine reduces the irritability of the peripheral motor nerves when it acts directly on them, while Wigger's increases it. Both widen the pupil, and both diminish the irritability of the sensory nerves. From these facts it seems obvious that a discrimination must be made between these two substances in their therapeutic use. When the object is to cause contraction of the blood vessels, slowness of pulse, reduction of temperature, and reflex action, then Bonjean's is the ergotine to use. Wigger's is useless as a hæmostatic, and when it is wanted to reduce temperature or reflex action it is not so good as the other, on account of its narcotic properties. Wigger's ergotine, on the other hand, increases the irritability of the peripheral motor nerves; hence, to produce labour it may be best to combine the

two and give the ergot in substance. An infusion, of course, only gives the constituents soluble in water.

XIX. The Fungus of Hooping-Cough (*Letzerich*).—This author ascribes hooping-cough, as he has formerly done diphtheria, to the presence of a fungus on the mucous membrane. He finds the specific constituents of the fungus in the expectoration, and he cultivates the plant on glass slides in sugar solution or veal jelly. He also inoculates the fungus on the mucous membrane of the trachea in rabbits, and has observed its mode of growth and spreading. The spores develop in the mucus, producing the usual mycelium, and they thus set up a catarrh of the mucous membrane. By and by the fungus spreads into the lung and produces a lobular pneumonia and capillary bronchitis. The paper is accompanied by a variety of drawings, showing the exact state of the parts and the appearances presented by the fungus in its various seats.

XX. Observations on Erysipelas (*Lukomsky*).—These observations are of great interest and importance, and as they were made under the eye of Recklinghausen, at Strassburg, we can have great confidence in their accuracy. They are divided into two sets, in the first of which the results of the observation of nine cases of erysipelas are given, and in the second a number of experiments on animals, and the conclusions deduced, are recorded. His general conclusion is, that there is a connection between erysipelas and the low organisms which the author calls micrococci. Their quantity and the rapidity of the spread of the disease were in direct ratio. The micrococci are minute globular bodies occurring in immense numbers, and distinguished from bacteria by the latter being rod-shaped. In his nine cases in the human subject he finds that wherever the erysipelas is recent and progressing, the micrococci are in abundance in the lymphatic vessels and serous canals (*Lymphcanaliculi*—*Saftkanälchen*). When the process was retrograding or stationary there were no micrococci although the inflammation might be more intense. His experiments on animals were made partly by injecting fluid from erysipelatous parts under the skin of closely shaven rabbits, and partly by applying such fluids to open wounds. In the former case a rapidly extending phlegmonous inflammation of the subcutaneous areolar tissue was produced, and in the part affected the micrococci increased very rapidly, and developed in enormous numbers in the serous canals and lymphatic vessels. In the second set of experiments a violent inflammation of the neighbourhood of the wound was produced, which extended rapidly to the skin where it could not be distinguished from erysipelas. In these cases, too, micrococci were found in abundance, chiefly at the periphery of the inflamed area, and where the inflammation was advancing, the micrococci passed from the wound into the serous canals, and thence into the lymphatic vessels. It is not easy to say how they are carried in, but that they are so there seems to be no doubt. It is also difficult to see how they disappear, but it is noted that even before the inflammation has disappeared they have gone, and they are to be found almost alone in the parts where the disease is actually advancing. It is also noted that these experiments prove the connection between the serous canals and lymphatic vessels, which was asserted by Recklinghausen, but has since been denied by some. Among the author's nine cases there is one in which the erysipelas occurred without any external wound, but in this case the micrococci were found just as in the others. The observations are illustrated by some excellent sketches.

XXI. The Existence of Coccobacteria in the Normal Tissues (Tiegel).

—The object of this paper is to determine whether the coccobacteria septicæ of Billroth, or its germs, exist in the normal living body, and may develop there independently of contamination from without. Billroth has proved that this organism is not capable of developing in the living tissues of animals, but its germs may exist there and develop after the death of the animal. To determine this the author uses a method by which portions of tissue are taken from newly-killed animals and preserved, so as to be protected from contamination. He excises portions of tissue, and after tying them with a thread just removed from boiling water, he dips them into a bath of melted paraffin several times successively, till they get a coating. Then he places them in a bath of half-cooled paraffin, so as to completely encase them; and afterwards he cuts the strings short and melts them in. The paraffin into which the tissue is first dipped is at a temperature of 110° to 150° C., so that it effectually roasts the surfaces, and destroys any germs derived from the atmosphere; but as the dip is only momentary, the heat does not penetrate deeply to kill any germs under the surface. After this treatment the mass is kept from four to twelve days at a temperature of 20° to 30° C. At the end of this time he finds bacteria already developed in most of the tissues of the body, the liver, spleen, salivary glands, lymphatic glands, testes, muscles, and blood. The author considers that the germs of this parasite get into the body chiefly with the food, and partly by respiration, and this view is confirmed by the fact that in these experiments they developed most abundantly in the liver, pancreas, and spleen.

XXII. The Origin of the Tube-Casts and Albuminuria (Senator).—

The views of this author are considerably at variance with those held by most, but though his paper is somewhat prolix, some of the facts brought forward are such as will at least demand attention. After an elaborate description of the albuminous substances found in the urine, which are somewhat various, he proceeds to consider the origin of tube-casts and albumen. It is usual to suppose that, in the various diseases of the kidneys in which these occur, there is increase of pressure of the blood in the vessels of the Malpighian bodies, and that the fluid constituents of the blood ooze out through the walls of the vessels into the urinary tubules. The fibrine of the blood is supposed to coagulate into tube-casts and the albumen to run off, forming the albumen found in the urine. The name commonly used in Germany for what we call tube-casts is based on this view; they are commonly called fibrine-cylinders there. The author, however, denies that these tube-casts are fibrinous; they are albuminous, but not that modification of albumen which we name fibrine. He reminds us that Virchow says that no increase of blood pressure is of itself sufficient to press out fibrine from the vessels, and that, therefore, any increase of pressure in the Malpighian bodies, however great, would be incapable of leading to an exudation of fibrine. The theory of the increased pressure is also seriously invalidated by the fact that in venous congestion of the kidneys, less urine is secreted than in health. The author accounts for this decrease by asserting that in venous congestion there is actually a diminution of pressure in the Malpighian tufts, and he endeavours to support this statement by a variety of considerations. He states that the arrangement of the vessels in the kidneys is such that in venous congestion the increased pressure is not likely to extend back to the Malpighian vessels. The capillaries of the kidneys are formed partly by the breaking up of the arteries directly, and partly by the efferent vessels

of the tufts, and any increased venous pressure in the capillaries will spend itself in great part on the arterics, and will not reach the tufts. Then, again, the swollen veins and capillaries, as well as the cedema of the renal tissue, will cause pressure on the renal tubules, with partial obstruction, and the urine collecting behind the obstruction will press on the Malpighian bodies, and help to counteract the pressure in the vessels, just as ligature of the ureter, or its obstruction, reduces the pressure in the tufts. This supposed diminished pressure in the Malpighian vessels would explain the reduction in the quantity of urine secreted, and if it can be proved it certainly overturns the views hitherto held as to the origin of albuminuria. As still further confirmatory, the author states that observers are agreed that increase of the arterial pressure in the kidney does not produce albuminuria. Having put aside the common explanation, the author is not very successful in accounting for the occurrence of albuminuria. In venous congestion there is doubtless much serous fluid pressed into the interstitial spaces in the kidneys, and this may pass through into the tubules, the epithelium of which soon becomes altered, being insufficient to eliminate the extra quantity of albumen. The tube-casts he has no hesitation in stating to be products of the epithelium of the tubules. We must confess to considerable doubt of Dr Senator's conclusions; the manner in which he disposes of the increased pressure in the Malpighian tufts in congestion of the kidney, seems to us rather like special pleading, especially as, even after death, the Malpighian vessels, like the rest, are very well filled with blood. They, in fact, generally stand out from the section as little red points, seeming to be rather specially full.

TRANSACTIONS OF THE BERLIN MEDICAL SOCIETY.*

PART I., 1866.

CONTENTS.—I. Account of the epidemic of cerebro-spinal meningitis which prevailed in the district of Danzig in the winter and spring of 1865—Professor Dr A. Hirsch. II. On the action of carbonic oxide gas on the respiratory and circulatory apparatus—Professor Traube.

I. Epidemic of Cerebro-spinal Meningitis (Hirsch).—After a detailed description of the conditions under which the epidemic of 1865 appeared, the author gives the results of his study of the disease in question. He considers that it should be ranked with diphtheria and similar infectious diseases in which a definite constitutional poison takes effect more particularly on one part of the system; and he denies its affinity to typhus or the malarious diseases. The forms of the disease are so various that it is difficult to define any one group of symptoms; but in general, it may be said that after a preliminary stage of malaise, or without it, shivering followed by a hot fit and severe headache mark the commencement of the disease. There is often a feeling of dragging and stretching in the neck, usually vomiting, delirium alternating with somnolence. Frequently a tetanic stiffness of the neck, rising it may be to opisthotonos; generalised hyperæsthesia, convulsions; less usually symptoms of paralysis. With all this constipation, sleeplessness, and occasionally exanthematous skin eruptions. Recovery is gradual and slow, and there is no crisis properly so-called. Death is ushered in by coma, quick small pulse, and other signs of collapse. The

* Abstracted and translated by David Foulis, M.B., Glasgow.

most successful treatment was by opiates, ice to head, local and very moderate bleeding.

2. **On Carbonic Oxide** (*Traube*).—The author concludes from his experiments: (a) that carbonic oxide excites the control nerve system of the heart, and thus gives rise to diminished frequency of the pulse: (b) that carbonic oxide excites the vasomotor centres, and so causes an increase in the frequency of the pulse, which precedes the diminution; (c) that carbonic oxide weakens the muscular tissue of the heart, and lessens the pressure of the blood.

PARTS I. AND II. 1869, 1870, 1871.

Part I. is occupied by the papers read during these three years, and of some of which a short analysis is subjoined. Part II. is a record of the sittings of the Society.

1. **Hypodermic injection of ergotine in aneurism** (*Langenbeck*. *Feby. 17th, 1869*).—The author advocates the injection of $\frac{1}{4}$ to $2\frac{1}{2}$ grains of liquid extract of ergot under the skin covering the aneurism, the injection to be repeated every two or three days. In one case of aneurism of the subclavian in close proximity to the innominate, this treatment diminished the size of the tumour, and allayed the more urgent symptoms. In another case of a small aneurism of the radial, the tumour disappeared after one injection, reappearing soon after, only however to fade away, leaving at the end of a week no trace of its existence.

2. **Chronic croup of the bronchi** (*Waldenburg*. *January 13th, 1869*).—In this case the disease had lasted for four years, if not longer; and casts of the bronchi were from time to time expectorated. The inhalation of lime water removed the disease in 45 sittings.

3. **Pathological longitudinal growth of long bones, and its bearing on surgical practice** (*r. Langenbeck*. *June 16th, 1869*).—The author alludes to the various causes—pressure, dragging, etc., which influence the growth of bones in disease; and comes to the conclusion that properly applied extension will lengthen a bone. He proposes accordingly to apply the method to shortened bones, with a view to restoring their length. The extension must be applied to the bone itself, and the joints excluded from the extension apparatus. The best form of extension is by weights; and the cure is to be aided by proper gymnastics of the limb, by electricity, and by strengthening baths.

4. **Excitability of degenerating nerves** (*W. Filehne*. *June 9th, 1869*).—The author shows that the first step in the advent of paralysis is a short stage of increased excitability, which is followed by depression of excitability of the nerves.

5. **Electrical treatment of a false joint** (*Hitzig*, *February 10th, 1869*).—In a case of false joint in which the ends of the bones were two inches apart, the induced current was applied. After 38 sittings the ends of the bones were found closely approximated by the shortening of the muscles.

6. **Paralysis of musculus serratus anticus major** (*Eulenberg*. *July 14th, 1869*).—The case in question was cured by the constant current. The author takes occasion to note that in certain severe forms of peripheral

paralysis the electro-muscular contractility is lessened for both kinds of currents. As the case improves the excitability to the constant current rises to, or even above the normal: while, later on, the abnormally high sensitiveness to the constant current diminishes, that to the induction current rising to the normal degree.

7. On subhyoid Pharyngotomy (*v. Langenbeck, December 1st, 1869*).—This operation, first suggested by Malgaigne in 1835, and first carried out on the living subject by Prat in 1859, was twice performed by the author for tumours in the throat. One case recovered: one died. The method followed is given by *v. Langenbeck*. The first step is tracheotomy, after which a sponge is used to plug the larynx and prevent the blood entering the trachea during the further steps of the operation. This done, the incision along the lower border of the hyoid bone is made, reaching from one omohyoid to the other. The fascia and sternohyoids having been divided, the thyrohyoid membrane and finally the mucous membranes are cut, and the epiglottis thus exposed is drawn forward by forceps. When the cut is properly made, the larynx is found to drop away to some extent from the hyoid bone. The superior thyroid artery and nerve are not in the way in making these incisions. When the larynx is thus drawn forwards the interior can be inspected, and any growths removed by the usual means. The author thinks the operation indicated where (a.) Foreign bodies in pharynx, situated in the pharyngo-laryngeal cavity, cannot be removed by the mouth. (b.) Tumours in this part of the pharynx are seated with broad basis in the mucous membrane, or in the wall of the pharynx between the mucous membrane and the muscular layer. (c.) Growths exist on epiglottis, aryteno-epiglottidean ligaments or arytenoid cartilages.

8. Treatment of Pott's disease of the vertebræ (*Eulenberg. June 28th, 1871*).—Author had treated a large number of cases, in all of which deformity had already shown itself: and he insists on the value of the treatment: namely, absolute rest in horizontal posture, use of an apparatus to fix the patient, and application of cold to the vertebræ. Inclined planes, etc., he rejects, as well as all apparatus not accompanied by persistent horizontal posture. The apparatus for applying cold to the spine is fitted into a hole in the mattress, and consists of a tin box with flanges to rest on the mattress. The box has a false floor on which the ice is laid, and which is forced up by springs gradually as the ice melts. The water runs away through perforations in the bottom of the box.

9. Manometry of the lungs, or Pneumometry, as a diagnostic method (*Waldenburg. November 1st, 1871*).—The force of the expiration (as measured by an instrument the index of which is furnished by a column of mercury) is in health equal to or greater than the force of inspiration. In disease either the inspiration or the expiration or both may be interfered with, and the author tries to show how the instrument may be made use of in diagnosis of difficult cases. In emphysema due to any cause, the expiration force is less than that of the inspiration: and a slight disturbance of the normal ratio in this direction may facilitate the diagnosis in the earliest stages of emphysema. (Emphysema is here used in the sense of alveolar ectacy with diminished elasticity, without necessarily implying destruction of the alveolar partitions). In Phthisis of all kinds the inspiration and expiration forces are both depressed, but the inspiratory the more so. The author proposes further investigation of this method, which he values as being capable of accurate measurement.

TRANSACTIONS OF

The Medico-Chirurgical Society of Glasgow.

SESSION 1874-75.

FIRST MEETING, 4th September, 1874.—The retiring President in the chair.

The following gentlemen were elected office-bearers for 1874-75:—
President—Dr James Morton. *Vice-Presidents*—Mr John Reid and Dr D. Richmond, Paisley. *Council*—Dr George Miller; Dr T. D. Buchanan; Dr R. Stewart, Coatbridge; Dr James Scanlan; Dr Alex. Patterson; Dr James Dunlop; Dr D. Taylor, Paisley; Dr Robert Perry. *Secretaries*—Dr Joseph Coats and Dr Gavin P. Tennant. *Treasurer*—Dr Hugh Thomson.

The newly-elected President, *Dr Morton*, read a paper on

MEDICAL CONSULTATIONS IN THEIR ETHICAL ASPECT.

Dr Richmond, Paisley, quite agreed with *Dr Morton* in his preference of what he might call the natural to the artificial mode of hatching consultants. The latter method, which obtained in London, consisted in separating, from the very outset of their career, a certain class for the office of consultant; giving them a high University education, superadding to the ordinary training at home a residence at foreign medical schools; placing them in hospitals, and giving them employment in the instruction of students. &c. No doubt this method had certain advantages; but, as *Dr Morton* pointed out, it gave the consultant little practical experience in the common run of practice, which differed very considerably from the practice of hospitals. The late *Dr Macfarlane* of this city, whose worth as a consultant was so widely acknowledged, would not, he ventured to say, have acquired that practical sagacity at the bedside for which he was noted, had he not emerged from the ranks of general practice. With regard to consultations, he might say for himself, that he approved of them, and would advise them in all cases of danger or difficulty. This course divided the responsibility, and was a great comfort to the ordinary attendant.

Dr Scanlan said that it was his practice to advise consultations when he himself was in doubt, and to accept them when the suggestion came from the patient or his friends. It saved reflections afterwards on the part of the latter, and gave satisfaction both to doctor and patient. He also frequently guided the friends in the selection of a consultant, by suggesting one or two as most conversant with the particular class of cases; but he would not circumscribe the medical liberty of the patient by refusing to meet with any one, if properly qualified. By even an inferior consultant, a suggestion of practical utility in the case might be made.

Dr Scott Orr thought the paper a very good one, and agreed with it in its main points. He himself was of opinion that they had too few consultants in Glasgow. The public were not apparently sufficiently educated in this matter, and did not sufficiently encourage consultants. His suggestion to the patient that a consultation should be had, was sometimes met with the answer—"He did not want a consultation." He (*Dr Orr*)

generally gained his point by replying that he himself wanted it. It was a great comfort in difficult cases, and almost always productive of some good. Dr Morton had incidentally alluded to the apprenticeship system, and on this subject he might say that he had doubts whether they did wisely in letting it fall into disuetude. He (Dr Orr) was himself one of the last of the apprentices, and he could testify that he had found what he had learned in this capacity of great use to him in after life.

Mr John Reid said that the greatest practical difficulty in regard to consultations was the idea that the consultant must always be a person of greater experience than the ordinary practitioner. There was something in human nature which made it appear to consist badly with the fitness of things that a person of less experience should advise in a difficult case with one whose experience, and therefore, presumably, his professional skill, was greater than his own. This apparent inappropriateness, of course, did not obtain where the consultant, though younger, had given special attention to the particular class of cases; and all ideas of unfitness should be banished if a consultation with a particular man was insisted on by the patient, even though the consultant called in should be much younger than the other. This, he thought, was apt to occur now more frequently than formerly. The popular idea seemed to be that medicine was making such rapid strides that the old practitioner was unable to keep pace with it, and that by calling in a young man they would get the advantage of modern ideas as to treatment. He thought that young men should be very chary and diffident in accepting a position of this kind. Medicine was a science of observation: the man who had had most opportunity of closely observing was *ceteris paribus*, the best consultant; and, for his own part, he had always been best satisfied in consulting with a man of long experience. When a younger practitioner, he had systematically declined to accept the position of consultant in any case. A junior man was put in a false position under such circumstances. He had generally found the men, both in Glasgow and Edinburgh, who had gradually attained commanding positions as consultants in the manner described by Dr Morton, to be sagacious and judicious in counsel. Of all the men with whom he had consulted, he would give the palm for eminence in these respects to the late Dr Abercromby of Edinburgh and Dr Macfarlane of Glasgow. Not that he would ignore the claims of young men in all cases; in the specific walks of practice they might really be more experienced than older men, and therefore quite justified in accepting consulting practice.

Dr Renfrew somewhat demurred to the depreciatory remarks on consultants "artificially hatched." The case against them had been much too strongly put. He held that for the niceties of diagnosis the consultant required a special training. In obscure cases, the man who had qualified himself by hospital experiences and systematic *post-mortem* investigation was much the most likely to make out the true character of the disease. In another point he differed from previous speakers, who seemed to accept it as an axiom that, in the event of the patient or his friends desiring it, the practitioner should in all cases accept a consultation with any man. This he held to be too broad a statement. There were young men in Glasgow (and no doubt elsewhere) who pushed themselves forward somewhat obtrusively, and he for one would not hesitate to decline a consultation, if he thought no good would come from it. It must be remembered that the purpose of the consultation was the good of the patient; and of the merits of consultants the patient was often a very ill-informed and partial judge. He might add that he had lost only one family of patients by calling in a consultant.

Dr Alex. Patterson said that occasionally cases did occur in regard to consultations in which one's duty was not quite clear. One such case he would mention. A patient's friends were wishful that he (Dr P.) should visit him, another medical man being in attendance. He told them that he would do so in consultation with the latter. They subsequently called, stating that the ordinary attendant declined to meet him as a consultant on the ground of his being his junior. On receiving this intelligence he laid the matter before several medical friends of large experience, and on their advice he acted. He wrote to the practitioner in attendance that he would meet him in the patient's house at a certain hour. This had the desired effect. The practitioner attended at the hour named.

Dr Maclaren said that in regard to the question raised by Dr Morton, whether they should have pure consultants, he took the view opposed to that upheld by several speakers. He believed that they should have a class of men of good social position, well educated, trained to some extent specially for the work, by travelling, visiting various hospitals, &c.—men perhaps of some means, and with literary capabilities. The ordinary class of practitioners were hardly able to keep pace with the advance at the present day. They had little time to acquaint themselves with the literature of the profession, and still less to add to it. The class of pure consultants, therefore, should be encouraged. The training of consultants in the manner indicated was universal in London, and he believed that in a few years it would also be so in Glasgow. He held that the late Dr Macfarlane would have greatly increased his usefulness, and even his high reputation, if he had devoted himself purely to consultant practice.

Dr Hugh Thomson said that it would be of much utility for their society to form a code of medical ethics for the West of Scotland. A code for the district was no doubt already in existence, but it was not well known.

Mr John Dougan said that a rule obtained in the hospital when he filled the office of clerk, to the effect that, in a case on which a consultation was held, the physician or surgeon who had charge of the case, in the event of divergence of opinion, had a *casting vote*. Now, he maintained when a consultant was called in in a case of his, while he would hear every suggestion made by the consultant, he should himself have the *casting vote*. As the man who was responsible for the case, this was the indefeasible right of the ordinary medical attendant.

Dr Morton, in reply, said that his object in reading the paper was rather to suggest the materials for discussion than to give an exhaustive essay on the subject. With regard to Dr Maclaren's observations, he trusted that if there was to be a closer assimilation of the profession in Glasgow and London, it would be by the latter city in medical matters coming nearer the state of the profession in Glasgow. In London there was an impassable gulf, it might almost be said, between the upper and the lower ranks of the profession. In fact, there did not exist there any class corresponding to the Scottish general practitioner. The larger part of the profession in Glasgow consisted of those who kept shops, who made their living by selling some coloured liquid, which he did not doubt was quite innocuous. There was no middle class between these and the highly accomplished consultant. The general practitioners in Scotland were admittedly intelligent; and their ambition was not damped by the conviction that they could not rise to the upper walks of practice. On the contrary, they saw men constantly rising from the ranks; and he still maintained that this was the proper and natural method of developing consultants. He thanked the Society for the manner in which they had received his remarks.

Obituary.

THE LATE SURGEON-GENERAL G. S. BEATSON, C.B., HONORARY PHYSICIAN TO THE QUEEN.

THE death of Surgeon-General Beatson appears to demand some further mention than the brief obituary notices which have as yet been published, both on account of the very important position he held in the medical department of the army, the services which he had rendered, and the serious loss which both his own department and the army generally sustain by his unexpected and comparatively early death. Having graduated at Glasgow and Edinburgh, George Stewart Beatson joined the medical department of the army at Fort Pitt in 1838, and, on July 13th of that year, received his first commission. He was appointed to an assistant-surgeoncy in the 71st Highlanders, but never joined that corps, and, in 1839, embarked on the staff for Ceylon; thus commencing a long term of Eastern service, which, interrupted by intervals of duty in other parts of the world, comprised the greater part of his career.

After a tour of twelve years in Ceylon, where he married, and where, in 1846, he was promoted, Dr Beatson returned to England in 1851, and almost immediately re-embarked for Madras as surgeon of the 51st Light Infantry, and with that corps took a part in all the important operations of the Burmese War of 1852-53. Accompanying his regiment to England, Dr Beatson arrived at home in August 1854; was advanced to the rank of staff-surgeon of the 1st Class in October of the same year, and immediately proceeded to Turkey. It was not his good fortune to witness the active operations of the Crimean War, but he was busily and usefully employed in the hospitals of Koolalee, Scutari, and Smyrna, ultimately embarking in October 1855 for Balaklava, and serving there as principal medical officer till June 30th, 1856. After a short period of service on half-pay, Dr Beatson was one of several first-class staff-surgeons who, after being in the position of administrative officers, were placed in executive charges, and as such he was appointed to the newly raised 2nd Battalion of the 22nd Foot, with which he did duty until promoted by Mr Alexander, then director-general, to be deputy inspector-general of hospitals on December 31st, 1858, in the same gazette with the present director-general, Sir William Muir, with Surgeons-General Frazer, Longmore, and James. Dr Beatson had entered the army without any special interest or assured prospects of promotion; and, although senior by several years to some of his contemporary deputies, his advancement, after only twenty years' service, was rapid, and was due entirely to the abilities which he manifested for the duty of the higher ranks.

Although he was personally unknown, or scarcely known, to the Director-General, Mr Alexander, that authority, ever ready to recognise ability, and to advance deserving officers, whether among friends or others, saw in Dr Beatson the qualities which fit a man for administrative work, and, by his promotion, turned them to account for the good of the department. After serving for a time as Deputy Inspector-General of Hospitals in the Ionian Islands, Dr Beatson was sent to Madras, to assume superintendence of the medical department of Her Majesty's British Forces in that Presidency—a charge for which he was especially fitted from his previous service and experience. In May, 1863, on the retirement of Inspector-General (now Sir William) Linton, he succeeded to the charge of the entire department in

India, and joined the head-quarters of Lord Strathnairn as Principal Medical Officer of Her Majesty's British Forces, the most lucrative, as well as the most important appointment, which can be held by any officer junior to the Director-General.

Dr Beatson assumed his new charge at a critical and most important time. Up to the year of the Mutiny, the position held by the British Medical Department in India was far from satisfactory. There was but one Deputy Inspector General of Hospitals in each of the minor Presidencies, and one Inspector-General in Bengal. Their duties were almost nominal, and consisted chiefly in the compilation of statistical returns, the professional and financial supervision being virtually in the hands of the superintending surgeons of the Honourable East India Company.

Some advance had, however, been made up to 1863. There had been an increase to the administrative ranks, and the Inspector-General of Hospitals was recognised as a member of the Army Head-Quarters Staff, the professional and sanitary adviser of the Commander-in-chief on all questions connected with the British Forces. Still much remained to be done; the *status ante bellum* was in many respects maintained; the financial direction of British hospitals was not in the hands of medical officers of the British Service; the newly acquired artillery, cavalry, and infantry transferred from the East India Company's Forces was still in charge of medical officers of the Indian Army, whose allegiance was divided; there was an obsolete code of rules; a defective subordinate establishment; a faulty system of equipment, each needing alteration; and there was, besides, a sanitary commission, then a sanitary commissioner, first a civilian, afterwards a major in the army, holding direct communication with Government, exercising great power, and trenching in many ways on the legitimate functions of the Principal Medical Officer.

In his relations with this anomalous institution, Dr Beatson could only accept what the Supreme Government had decided upon, and, in the treatment of questions, could but concur when the action was right, and record his dissent when views were advanced which he knew to be injudicious. To the important questions which came before him—the proposed amalgamation of the British and Indian Medical Services, the rectification of the position of his own department—as well as those questions having more direct bearing on the welfare of the British soldier, Dr Beatson brought long experience, clearly formed views, and sound judgment, as well as capabilities for work to which few, if any, of his predecessors could lay claim.

The history of Dr Beatson's first tenure of office as head of the medical department is virtually the history of that department from the transition state of 1857 to that which it now occupies. By firmness, tact, and the weight of his local knowledge and experience, Dr Beatson effected many improvements; and during the five years, from 1863 to 1868, many important reforms were carried out. A large increase to both administrative and executive ranks of the department was established; the anomaly was abolished by which professional and financial details were vested in separate authorities of distinct services; a more complete subordinate establishment was allowed; a new system of purveying; a revised scale of dietary; and improved plan of hospital equipment, were all introduced, while many obsolete rules were abrogated and new ones were substituted. All British troops were in medical charge of officers of the British Medical Service, subordinate to the Inspector-General, while he was himself recognised as in a position of direct adviser to the Supreme Government on questions of interest to the British Forces.

In the vitally important question, too, of improved barrack accommodation, and the large increase to the hill-stations for the European Forces, Dr Beatson's views were accepted by the Government of India, and, in a great measure, carried out. Thus, when Dr Beatson embarked for England in 1868, he left the department to his successor Dr Muir in a state vastly changed and improved, and it required but the judicious selection of subordinate administrative officers to make permanent the position it should hold, and to secure for the advice which its members might be called upon to give that weight and consideration which ability and experience, when united, cannot fail to command.

Dr Beatson, having been relieved in India by the present Director-General, returned to England, and assumed medical charge of the Royal Victoria Hospital at Netley. Here the inconsistency of the system of military hospital administration became strikingly apparent. An officer second only to the Director-General in England, holding the rank of major-general, and who, for five years, had not only superintended the hospital administration of the whole of India, but had been in direct communication with the Supreme Government and military authorities of that country, found himself subordinated first to a major-general, as governor of the hospital, and subsequently to a lieutenant-colonel, to whom, or to any junior military officer acting for him, he was obliged to refer matters of even trivial importance, and whose orders on various subjects he was expected to carry out.

It could not be wondered at that, on the transfer of Dr Muir from India to Whitehall in 1872, Dr Beatson welcomed the order which relieved him from such a position, though the order necessitated a return to India, and separation from many members of his family.

The appointment of Dr Beatson a second time to the charge of the department in India called forth at the time numerous comments, and those who were uninformed of the real state of the case imagined that, in his holding again the great prize of the service, an injustice was done to others; yet it was in the ordinary routine of the service, unaltered by favour or affection, that Dr Beatson was again sent to Bengal. He was at the time first on the list of Inspectors-General for foreign service, and would have been equally obliged to go abroad wherever the vacancy had occurred. As it happened, the vacant post was the same which he had before held, and it would have been unjust to him to deviate from the ordinary course of relief to give advantage to another officer. During the four years of his absence from India, while Dr Muir held charge, the interests of the department had been well maintained, and in some respects improved; so that Dr Beatson might well hope, as he did, to be able to conduct the affairs of his office without the anxieties of changes and the necessity for new reforms.

But the movements of the Government and the army head quarters, together with the special suprintending duties of his post, compelled him to travel long distances, to undergo considerable fatigue, and to spend part of two hot seasons in Calcutta. He had suffered from attacks of fever from time to time, and, when in Calcutta during April last, was sorely tried by the climate. As he expressed it, he felt "he had enough of India;" and, considering how many years of his service he had spent there and in Ceylon, he might well say so. Ordered to join his office at Simla, he left Calcutta on April 22nd; but, his constitution having been gradually, though surely, undermined, he suffered greatly on the journey, arriving at Simla on May 4th in a state of prostration, from which he never completely rallied. Particulars of his illness and death have not yet, of course, been received; but it is known that he had repeated febrile attacks, with hepatic pain; and,

at the date of the last letters received, May 21st, he was much worse: temporary improvement had passed away, and he had lost all the little ground he had gained.

Nothing further is known beyond the brief telegram received on June 8th, stating that he had died on the previous day. In all probability, liver-abscess was the cause of death.

In Dr Beatson, the Army Medical Department has lost one of its most able members, and one marked by the opinion of his brother officers as fit to succeed to the highest departmental position. He possessed a singularly accurate and retentive memory, which, in a position such as his, where so much depends upon precedent and regularity, was especially valuable. He was seldom wrong in the facts upon which he formed his opinions, and his deductions were clear and logical. His remarkable clearness and accuracy were very prominent on the occasion of his examination before Mr Sidney Herbert's Committee in July 1857; and it was the impression which his evidence made upon Mr Alexander, as well as on the several members of that committee, which, perhaps, more than anything else marked him as fitted for advancement. In his career in India, where more than elsewhere he was prominently before the eyes of the department, he showed great zeal and energy in the cause of the British soldier.

Second only to the interests of the army and the public, he held the interests of the medical department in the highest consideration; and only those who were in official intercourse with him know how much his brother officers owe to his exertions. Few were so well acquainted with all matters connected with the service, and none could be more jealous of its welfare. In his administration, he was invariably just; and, while liberal and indulgent to those who showed that their duty was their first consideration, he was strict in his efforts to repress anything detrimental to the professional or social character of the department over which he presided. He never carried official differences into private life, and was in terms of the happiest social intercourse with those whom he could not but oppose in their public capacity. He was a strong supporter of the new departmental system, and an advocate also of amalgamation with the Indian Medical Services, on the basis of separation of the civil from the military elements. In every relation of life, he was genial, kind, and considerate; and his death will long be felt, not only by his widow and immediate family, but by very many others who were much attached to him, and who have to regret a friend not soon forgotten and not easily replaced. (*British Medical Journal*. June 20th, 1874.)

THE LATE DR WILLIAM LYON.

DR WILLIAM LYON died on February 25th, at his residence, Brandon Place, West George Street, Glasgow. The following short notice appeared in the *Lancet* of May 30, 1874:—

A long and useful life has recently terminated by the decease of Dr William Lyon, for more than half-a-century a practitioner of medicine in Glasgow and its neighbourhood. Dr Lyon took the licentiate-ship of the Faculty of Physicians and Surgeons in 1816, of which body he became a Fellow in 1828. Commencing practice a few miles east of Glasgow, he rapidly rose in reputation till he removed to the city itself, where he resided for many years in London Street. About 1844 Dr Lyon was appointed surgeon to the Infirmary, at the same time becoming lecturer on surgery in the now defunct Portland Street School of Medicine. He was some time

President of the Glasgow Medical Society and of the Glasgow Medico-Chirurgical Society ; in fact, there were few medical institutions in Glasgow with which he had not been more or less connected. As a consulting surgeon he stood in high esteem in the west of Scotland. In 1859 the University of Glasgow conferred on him the honorary degree of Doctor of Medicine.

With all his active employment, Dr Lyon found time to contribute to the literature of the profession, and enriched the Edinburgh, Glasgow, and metropolitan journals with such papers as those on "Cæsarian Section," "Case of Ligature of Common Iliac Artery," "Gutta-percha in Club-foot and Fractures," "Reminiscences of Hernia," and so forth. As a proof of the assiduity with which he stuck to his post, he never went to London till 1851, when he visited the Great Exhibition. He was highly popular with his professional brethren for his geniality, shrewdness, directness of purpose, and fertility of resource. He was a bold and successful operator, and was among the first in the West of Scotland to recognise the efficacy of ovariectomy. To the last he retained his interest in his profession, and only two months before his death was re-elected a director of the Royal Infirmary, his connection with which institution had ceased several years before. Dr Lyon, who was twice married, leaves a family by his first wife.

THE LATE DR H. R. HOWATT.

ONE of the oldest practitioners in the south side of Glasgow, died on July 16th. Dr Howatt obtained his diploma from the Faculty of Physicians and Surgeons in 1840 ; and since then he has been in busy practice, having secured the confidence and respect of the public, and the high esteem of the profession. He received the degree of M.D. from the University of Aberdeen in 1851 ; and in the same year he was elected a Fellow of the Faculty of Physicians and Surgeons of Glasgow, in whose proceedings he always took much interest. He was for many years Vaccinator to the Faculty, and of late he had the honour of a seat at their Council Board. He was closely connected with the origin and success of the Glasgow Southern Medical Society, which was founded thirty years ago ; and he made occasional contributions to their proceedings. He acted for a long time as Treasurer of the Medico-Chirurgical Society of Glasgow ; and at the time of his death he was also a Trustee of Anderson's University and a Director of Stirling's Library. His aptitude for business and all that concerned the forms of procedure was so well known that, notwithstanding his natural modesty, he was generally regarded as an authority on all such points. There was, however, in his character something of a higher quality than business precision ; and his genuine amiable nature, tinged with a degree of quiet humour, endeared him to all who came into intimate contact with him.

A year ago, his usual robust health was invaded by the beginnings of malignant disease, which even then threatened his life : but he recovered so far as to be able to overtake with comfort most of his usual duties till the beginning of July, when his fatal illness set in. He died on July 16th, aged 57. His funeral had something of a public character. The profession, and particularly the Southern Medical Society, were largely represented ; and many spectators in the neighbourhood of his residence, and on the way to the Old Gorbals burying-ground, watched the funeral procession of one who was so well known. (*British Medical Journal*, 8th August, 1874.)

Medical News.

GLASGOW SANITARY DEPARTMENT.

The following short tracts have recently been issued from the Sanitary Department, Glasgow. They are neatly printed, each extending to four pages, with the Glasgow arms at the beginning. We more especially commend to the attention of our readers the last of the series—"The Law about Infectious Diseases." It is of great importance that the profession should be fully aware of the demands of the Law in cases of Infectious Disease, as the medical attendant becomes in a measure responsible for the proper management in their public as well as their individual and private regards of such cases.

1. HINTS ABOUT THE MANAGEMENT OF CHILDREN.

The Committee of Health of Glasgow, thinking that a few plain hints as to the care and upbringing of the Child whose birth you have just Registered might be useful, hope you will pay earnest attention to the contents of this paper.

Washing Baby.

Give baby a bath night and morning, using tepid water and a little soap. If accustomed to it from the first, even the youngest child will enjoy it. This, with care in changing clothes and sponging or washing gently with flannel, will both promote general health and prevent scalding.

Dressing Baby.

The clothing should be warm, and fit easy. There should always be flannel next the skin. Tight bandaging, with the notion of "supporting" the body, is not only unnecessary but hurtful. Heat is life to an infant; and until children are able to run about, no part of the body, except the head and hands, should at any time be bare.

Feeding Baby.

A newly-born baby should be put to the breast as soon as it is washed and dressed. This is best for both mother and child. We cannot improve upon this natural proceeding. The milk first supplied by the mother acts as a laxative, so that castor oil is unnecessary.

Should the mother have no milk at first, pure cow's milk, with an equal quantity of hot water and a little sugar, may be given until she is ready to nurse.

Provided the mother has plenty of breast milk, the child should get nothing else until it is six (at the very least, four) months old.

Put the child to the breast for the first six weeks every two hours during the day, and less frequently as it grows older. During the night it requires to be fed less often. Regular habits may be cultivated from the earliest age. It is a mistake to suppose that whenever a baby cries it requires the breast. It is dangerous to put the baby to the breast and then fall asleep. The child may be smothered, or at least indigestion and colic may be produced. If the mother has not enough breast milk, then it must be supplemented with a mixture of two-thirds pure milk to one-third warm water with sugar.

If, unfortunately, the baby must be brought up entirely "on the bottle," then (1), Use only pure fresh milk, in the proportion of two measures to one of hot water, with a little sugar. In cities the milk may generally be used as bought, but made lukewarm, and slightly sweetened. (2), Prepare no more than can be taken at once. What is left should be thrown

out. (3), Never lay baby down to sleep with the teat in his mouth. This is sure to cause colic, (4), Wash the bottle carefully after each meal, and lay it in cold water until required again. The greatest pains must be taken to wash out the India-rubber tube and teat, so that no bits of curded milk may be left. (5), In hot sultry weather dilute the milk with a third part of lime-water instead of pure water, and then make lukewarm.

There is no substitute for good milk, and no necessity for supplementing it. Corn-flour, arrowroot, and such starchy articles are bad for young infants.

Weaning Baby.

The child should not be weaned suddenly but by degrees, and as a rule should not have the breast after the ninth month. After the sixth month bread and milk or oatmeal gruel thickly made may be given once or twice a day. Well boiled oatmeal porridge and sweet milk should be gradually introduced into the diet.

With porridge and milk night and morning, and the thin of broth, with bread, to dinner, children will thrive from the period of weaning. There is no diet so nutritious, so thrifty, or so easily prepared.

The habit of giving children, especially infants, share of their parents' food is a bad one, in cities where people have so generally abandoned the old Scotch fare, and taken to tea, bread, and fried or stewed meat. Take the trouble of making wholesome food for your children, and do not ruin their stomachs, and risk their lives, by giving them tea and toast, beef, bacon, &c.

Fresh air and exercise.

Although nobody will drink dirty water, it is astonishing how few take pains to avoid breathing dirty air. Children suffer more than adults from badly ventilated houses. They are tenderer, and pass the greater part of their time in the house. Open your windows a little at the top. Never keep dirt of any kind in your house a minute longer than necessary. The air of half the houses in Glasgow is made poisonous by carelessness in these respects, especially at night.

Take your children out for a walk every fine day. The time spent by many mothers in gossiping by the fireside or on the stairhead would give their families a walk. Taking them about at night or in wet cold weather should be avoided.

Sleep.

Don't accustom your baby to be rocked or nursed to sleep, or to sleep in your arms.

Fresh air makes sleep more refreshing. The air cannot be fresh if the bed-clothes are dirty. Enclosed beds are very unhealthy. Young children in bed with their parents may be injured, or even smothered, by getting wholly beneath the bed-clothes.

Sleep comes naturally to a healthy child. Wakefulness means illness. During teething, when the child is irritable and restless, never use soothing syrups, sleeping draughts, laudanum, or any other medicine. Besides being poisonous, they are all mere devices of selfishness, saving the mother trouble at the expense of the child's welfare. Patience will overcome the wakefulness, and your baby will be all the better in the morning.

To Nursing Mothers.

The living connection between the body of the mother and the body of the child, which exists before its birth, and makes both suffer from injurious influences, continues throughout the period of suckling.

Nursing mothers should therefore preserve as much peace of mind and body as possible. They should have plain nutritious diet. Above all things they should avoid whisky. For a nursing mother to drink whisky is almost as bad as to give it to the child directly, which would be to poison it.

To Parents.

No advice can be of the slightest use unless you, the parents—or you who assume the duties of parents—of this child honestly resolve to let no selfish motive of convenience, or pleasure, or profit divert you from that which must be your first thought in the morning, and last at night—to cherish and make healthy and happy the life which is so unreservedly put under your control. You must make up your minds to sacrifice yourselves for it, and do as you would be done by if you were equally dependent and helpless. The mother especially must remember that at least for the first year of the child's life she must devote herself body and mind to it. Any reason or argument for shirking the duty of suckling must be looked upon with suspicion, however plausible. A woman who can suckle her child, and will not, increases a hundred-fold the risk that child runs of losing its life, and, should it die, to that extent she causes its death.

2. HINTS ABOUT THE PREVENTION OF SCARLET FEVER.

The Committee of Health of Glasgow hope that parents and others will read this Paper carefully, and adopt the instructions which it contains, and any others given by the Medical Attendant having the same end in view.

Scarlet Fever is a very infectious and a very dangerous disease. A mild case is as infectious as a severe one, and Scarlet Fever is never so mild that it may not in the long run prove dangerous to life, or even fatal.

One case of Scarlet Fever is always derived from some other. It is, therefore, the duty of every parent or person who has charge of a case, to remember that they are responsible for a disease which tends to spread, and to adopt such precautions as will prevent it from doing so. These are all embraced in the words *Isolation* or *Separation*, and *Disinfection*.

Isolation.

Isolation means the separation of the sick from the neighbourhood of every person not necessary for proper nursing and treatment. This may be done in two ways.

By sending the patient to a hospital, which, as a rule, is the only perfect way. The Committee have provided large and well-appointed hospitals for this purpose. In the case of children of tender years, or when a whole family is ill, they will permit mothers to go with and nurse their own children.

By keeping the patient at home, and cutting off all communication with the healthy. This is more difficult, and in the case of the majority of families in Glasgow impossible, to do. It involves, if done perfectly, a great many points, the chief of which are—

1. Send the children who are well out of the house. At least, keep them out of the sick-room. In certain cases, the Committee are willing to accommodate children in such circumstances in the Reception House, Weaver Street, free of charge.

2. When a choice is possible, the room selected should be large, well-ventilated, and have a fire burning. Never choose the kitchen, as it is the centre of the house, and disease there cannot be separated.

3. Remove carpets, curtains, hair-cloth chairs or sofas, and every unnecessary piece of furniture. Iron bedsteads, hair, or still better, straw mattresses, and kitchen chairs, in short, all articles which will not take in infection, and which can be easily disinfected, are to be preferred.

4. The room must be occupied only by the patient and the person nursing, and never entered by any one unnecessarily. No child belonging to the family should go to school. No person nursing a child in Scarlet Fever should go shopping or visiting. The gown or outer garment should be a washing print, and winceys or other stuff dresses should not be worn. Women, especially, should avoid neighbours' houses where Scarlet Fever is, particularly during convalescence. Much mischief is done by parents gossiping in each others' houses, or even making sympathetic visits, in such circumstances.

5. No teacher of a School should receive a pupil who is known to have had Scarlet Fever recently, or to belong to a family any member of which has Scarlet Fever, until a certificate of freedom from infection has been presented, signed by a legally qualified medical practitioner, or by the Medical Officer of Health.

Disinfection.

The body, and everything about and discharged from the body of a person infected with Scarlet Fever, is infected, and therefore capable of imparting the disease to other persons. Disinfection includes all methods by which the infected matter or material can be deprived of infecting power.

Cleanliness, not of a surface sort, but thorough in all the holes and corners of the house, below the furniture, as well as in the middle of the floor; in all the folds of the bedding, as well as in the coverlet, is the first and essential step towards disinfection. All the dust swept up or rubbed down should be placed in the heart of the fire and so burned, not thrown among the ashes, and so sent to the public ashpit.

Ventilation is a part of cleanliness, and is best maintained by leaving a chink of the window open at the top, and keeping a nice bright fire burning. There is no danger of cold draughts if this is done constantly, but there is danger, if now and then, or only when the Doctor or Inspector calls, the window is drawn down, and a rush of cold air admitted to the over-heated room.

Disinfection During Sickness.—Scarlet Fever patients always cast their skin, and so long as a particle of old skin is visible, the patient is infectious, and subject to all the clauses of the Public Health Act relating to infectious diseases, a printed explanation of which may be had at the Sanitary Office.

The dead skin comes off partly in flakes, but partly also as dust, which flies everywhere and clings to everything. To prevent this, so soon as the redness begins to disappear, rub the whole surface of the body over with camphorated oil, mutton fat, or any other agreeable and convenient oil or fat. Do so every night, and whenever the patient is able to stand it, give a warm bath, washing the whole body with carbolic acid soap. A succession of such baths, followed by oiling, until the whole skin is removed, will prevent the infectious dust from flying about, and in the end will disinfect the patient's body.

This oiling and bathing is the most important disinfecting process which can be adopted in Scarlet Fever, but a few more directions are these:—

Use separate bits of rag for wiping the poisonous discharge from the mouth and nose, and burn each bit as it is used.

Put chloride of lime or Burnett's Fluid (a table-spoonful) into the vessels used for the discharges, remembering that the spit or discharge from the throat is particularly poisonous. Prefer Burnett's Fluid if your house has a w.c.

Prepare a steep in a tub containing a wine-glassful of clear carbolic

acid, or a wine-glassful and a half of Burnett's Fluid to each gallon of water, and put all bed and body clothes removed from the patient therein until washed. They should afterwards be well boiled.

Disinfection after Recovery or Death.—After the last bath, when every particle of old skin is away and recovery perfect, a fresh suit of clothes from the skin out should be put on by the patient, and also by the nurse; and disinfection of the apartment, bedding, and other infected articles should forthwith be carried out. It is impossible to give instructions which unskilled persons can follow as to fumigating rooms, &c., &c. The services of the Sanitary Department, 1 Montrose Street, are at the disposal of all classes, and the aid of their officers ought in all cases of infectious disease to be sought, if not during the sickness at least on its ending, whether in recovery or death.

In case of death the body should be interred with the least possible delay, and in houses where the living must remain in the same apartment, the body ought either to be interred at once, or handed over to the care of the Sanitary Department, which will be responsible for its safe keeping until such time as arrangements are made for interment.

3. THE LAW ABOUT INFECTIOUS DISEASES.

The Committee of Health of Glasgow, in order to remove all excuse of ignorance in cases of contravention of the enactments of the Public Health (Scotland) Act, and in the hope that a wider knowledge of those enactments will lead to their general observance, beg the attention of the Public to the following short statement, in plain language, of the Law about Infectious Diseases, and the Penalties which will follow its infringement:—

The words "Infectious Disease" include Scarlet Fever, Small-pox, Typhus, Enteric and Relapsing Fevers, Measles, Hooping Cough, &c.; and the enactments apply to all stages of those diseases.

Disinfection.

The occupier or owner of a house in which any infectious disease has been, is legally bound to clean and disinfect it, and "all infected articles therein likely to contain infection," to the satisfaction of the Local Authority, or to permit the officers of the Local Authority to do so, under a penalty of £1 for every day during which these precautions are neglected.

Letting Infected House.

It is illegal to let any house, or part of a house, in which infectious disease has been, previous to disinfection of the house, and all articles therein likely to be infected. A hotel is included under the term "house." Penalty, £20.

Infecting Public Conveyances.

It is illegal for a person suffering from any infectious disease to use a cab, tram-car, omnibus, railway carriage, or any other public conveyance, without informing the person in charge thereof, who may then refuse to convey them. Penalty, £5.

It is illegal for the owner or person in charge of a public conveyance, which he has permitted to be used by an infected person, to hire or to put it to public use until it has been disinfected. Penalty, £5.

Public Exposure of Infected Persons.

It is illegal for any person suffering from infectious disease to go, or any one in charge (as for instance a parent whose children are ill of Scarlet Fever) to take or send such a person to any public place, such as to school, church, market, to a dispensary, to a common stair, street, court, or playground, or any place where the public will be endangered. Penalty, £5.

Public Exposure of Infected Things.

It is illegal to give away, lend, sell, transmit, or otherwise bring into contact with the public, any article or thing which has been "exposed to infection." The following are a few illustrations of modes in which the law may be broken in this respect:—

1. By washing infected clothes in public washing-houses, or by drying the same in public greens, if washed and not disinfected.

2. By sending infected bedding to upholsterers or to public dyeing and cleaning establishments.

3. By persons who work in a house where infectious disease exists and send articles to shops, warehouses, or private parties, *e.g.*, dressmakers, tailors, shoemakers, shirt-sewers, muslin-clippers, knitters, shawl-fringers, &c., &c., &c.

4. By persons who sell goods from a house or shop where infectious disease exists, *e.g.*, all dairies or milk-shops, all grocery and provision shops, confectioners' and toy shops, &c., &c., &c., forming part of a dwelling-house where there is infectious disease.

5. By persons who pawn infected bedding, clothing, or other articles from a house where infectious disease exists.

The penalty for all offences of this description is £5.

N.B.—The Sanitary Office, 1 Montrose Street, is open on Sunday from 9 to 10 A.M., and from 4 to 5 P.M., and on all other days from 9 A.M. to 7 P.M. Every assistance and advice as to the management of Infectious Disease, so as to comply with those enactments, will be given; and any information which will lead to the conviction of parties contravening those enactments will be gladly received there within these hours.

LIST OF EXCHANGES.

Great Britain.—Braithwaite's Retrospect of Medicine. London.

The Journal of Mental Science. London.

Transactions of the Obstetrical Society. London.

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